



# ISA eBusiness Implementation Guideline

Draft Version 1.2  
July 2006

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The ISA eBusiness Committee

Written for your industry,  
by your industry

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# Introduction

## Revision History

1. Draft Version 1.0, Reviewed by participants, December 9, 2005
2. Draft Version 1.1, Reviewed by participants, February 8, 2006
3. Draft Version 1.2, Reviewed by participants, April 12, 2006

## Change Summary

This is the first draft of the ISA eBusiness Implementation Guideline. Manufacturer and distributor companies continue to conduct pilots to validate the viability of these guidelines. In the future, changes from the previous to the current guideline will be summarized in this section.

## Purpose

The purpose of the ISA eBusiness Implementation Guideline is to create, for the Industrial Supply Association (ISA) and its channel partners, a guideline on the timely exchange of accurate business data with a focus on item identification and electronic business transactions. The goal is to support the business process of buying and selling industrial supplies.

## Background

The ISA eBusiness Guideline was developed by the ISA eBusiness Committee, through a series of webinars and teleconferences, eBusiness Summits, face-to-face meetings and pilot programs conducted by member companies.

## ISA Committee Job Description

As chartered by the ISA, the ISA eBusiness Committee, which created these guidelines, has the following Job Description:

*The Committee is charged with the collection and dissemination of information on trends relative to electronic business communications, standards, practices, and data collection in the MROP industry. In this regard, the Committee's objective is to add value and reduce costs throughout the supply chain through up-to-date, efficient and relevant electronic commerce standards and communications. The Committee will interface with other similar industry groups as appropriate. The Committee would also be responsible for analyzing relevant information and making recommendations regarding other initiatives in this area, which the Committee feels, should be undertaken by the Association. Periodic surveys of the MROP industry relative to the adoption of electronic business standards and practices should be undertaken by the Committee in order to assist them in their work. A central focus of the Committee is to participate in the development, promulgation and adoption of industry electronic business standards; and to provide education and training on electronic business issues to the MROP industry.*

## Scope

While the MROP supply chain includes many business partners, the scope of this eBusiness Guideline is the exchange of business information between the distributor and the manufacturer (the buyer and seller). Manufacturers and Distributors may outsource some business processes to third parties, which would take on the role of either the buyer or seller such as manufacturer's sales or stocking representatives, third party warehouses and so on. Currently, the scope of this document does not include parties such as transportation companies, the end consumer, or raw material supplier.

An exception to this is custom industrial supply items. Custom industrial supply items are made-to-order, one-of-a-kind items made by a manufacturer, for another company, to be used in Maintenance, Repairs, Operations or Production (MROP). Custom industrial supply items are sold from business to business.

The MROP Supply Chain is dynamic, and continues to mature beyond this immediate trading partner relationship. As such, these guidelines will eventually include the complete supply chain from raw material acquisition to end-user customer purchase.

This guideline focuses on the unique identification of products and locations plus the electronic exchange of regular business documents. Individual items, cases and pallets can be identified with bar codes to eliminate data entry and aid in inventory, shipping and receiving.

Core item attributes are defined (description, weight, unit of measure, etc.), along with guidance on how to assign globally unique trade item numbers. Similarly, Order-by, Ship-to and Remit-to locations can be given unique global location numbers to eliminate confusion, duplication and maintenance of multiple cross-reference tables for company identification.

Once a method for company and item data alignment is established, Trading Partners are ready to begin the electronic exchange of timely and accurate business documents including purchase orders, purchase order acknowledgements, and invoices.

Methods for exchanging data include Electronic Data Interchange (EDI), eXtensible Markup Language (XML) and standardized flat file formats. Internet e-forms, which cannot be automatically integrated from one computer application to another, are not included in the ISA eBusiness Guidelines. However, some trading partners may agree to use them.

The ISA eBusiness Committee is sensitive to the fact that many trading partners have limited technology resources. The committee is also mindful that inefficiency and cost must be removed from the supply chain, not merely handed off to other parties. Methods of identification and electronic business transactions must be as simple as possible, while still obtaining the objective of better, faster business processes.

## Standards are Voluntary

While the ISA eBusiness Committee will set guidelines and identify supply chain management best business practices regarding the electronic exchange of business data, item identification, and Automatic Identification Data Capture, participation remains voluntary. Committees, work groups, or other similar bodies, must always remember the purpose of their work is to enhance the ability of all industry members to compete more efficiently and effectively to provide better value to the customer. Because standards activity almost always involves the cooperation of competitors, great care must be taken to assure compliance with anti-trust laws. This means participation must be voluntary, and failure to participate shall not be used to penalize any company. The recommendations coming out of the ISA eBusiness Committee are just that. Individual companies remain free to make independent, competitive decisions. All standards developed by the ISA are voluntary standards. Language in the standards and guidelines will include such words as “mandatory,” “required,” “must” and “shall.” These terms convey the concept that to adhere wholly to the standards, certain conditions must be met. However, the use of part or all of a standard or guideline remains voluntary.

## North American Standards and Guidelines

The ISA eBusiness Guidelines are written for North American trading partners (U.S. and Canada).

Guidelines provided here for bar coding and assigning globally unique item, location, and asset identification numbers follow the methodology used by GS1 and GS1-US. While references might be made to the types of global trade item numbers used outside of North America, this guideline would not be adequate for a non-North American trading partner. Non-North American trading partners should seek additional guidance from GS1 ([www.gs1.org](http://www.gs1.org)). It should be noted, however, that the methods provided here, and used by North American trading partners for identifying items, locations and assets, are recognized and accepted globally.

The Electronic Data Interchange (EDI) maps provided in this guideline use American National Standards Institute (ANSI) X12 nomenclature, and as such, might not be recognized outside of the U.S., Canada or Mexico.

Flat File formats will be created by the ISA eBusiness Committee for a future release of the ISA eBusiness Guideline. While these flat file templates may be used outside the ISA community, they may not be recognized as “standard” in other industries.

It is important to note that North American manufacturers and distributors will have varying requirements from their customers when those customers are in other industries, such as automotive, aerospace, utilities and the U.S. Department of Defense. These industries may have their own item identification, electronic business transaction, and bar code guidelines.

## Electronic Commerce (EC) and Electronic Business (eB)

The terms “Electronic Commerce” and “Electronic Business” have been used interchangeably over the years. Electronic Commerce originally was a blanket term used to describe business processes augmented by eB tools, such as Electronic Data Interchange (EDI), e-mail, intranet sites, smart cards, and so on. Recently the popular use of the term “EC” has narrowed to denote selling product over the Internet. Terms like Business-to-Business (B2B), eBusiness, and Electronic Business Transactions describe the electronic exchange of business information from one trading partner to another.

This ISA eBusiness initiative **does not cover selling trade items over the Internet**, via Web stores, to

business partners or to the end consumer. This document is concerned with the exchange of timely and accurate business-to-business information such as trade item descriptions, purchase orders, and invoices, using electronic business transactions and bar codes.

## Next Steps

Currently the ISA eBusiness Committee is working on the EDI 860 PO Change transaction, plus flat-file formats for exchanging item and company information. The Committee will also provide EDI Guidelines for ANSI X12 Version 5010. The EDI Guidelines supplied here are in Version 4010 which is the most popular version in use today.

## Acknowledgements

- 3M Industrial Business
- Carboloy Inc
- Columbus McKinnon Corporation
- EA Engineered Abrasives Canada Inc.
- GS1 & GS1-US
- H.L. Bouton Co. Inc.
- Martin Supply Company Inc.
- MSC Industrial Direct Co. Inc.
- Norton Company
- Oliver H. Van Horn Co.
- Simonds International
- Weiler Corporation
- Zenger's Inc.

ISA would like to acknowledge the significant contribution of the Foresight Corporation ([www.foresightcorp.com](http://www.foresightcorp.com)) for providing a copy of EDISIM™ which was used to create the ISA EDI transaction set documentation.

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## ISA eBusiness Guidelines Change Process

It is important to have a simple, but effective and accountable Change Request (CR) process for the ISA eBusiness Guidelines. This provides a formal vehicle for feedback from the user community as well as a mechanism for adding functionality as needs arise. This sets a democratic tone for the users. They must be a part of the guideline maintenance process as they test the principles in these guidelines with real-world implementations.

However, the ISA eBusiness Committee is mindful of the fact that changes cannot be made simply to accommodate a specific user's needs relative to their legacy system. Changes to the guideline must reflect best business practices for ISA member companies and their channel partners.

The ISA eBusiness Committee will, from time to time, make changes and enhancements to the guideline that will not go through the CR process. The CR process is primarily a tool for ISA member companies.

**Guideline Versioning** – Guideline versioning is important to provide stability within a given version and to allow both users and solution providers with a transition strategy from one version to another. The ISA eBusiness Implementation Guidelines are released January 31 and July 31. Changes to the guideline are classified as “Major,” “Minor,” or “Errata” (typographical errors). The Change Summary at the beginning of this document contains the changes that have occurred since the last version. Changes that are classified by the ISA eBusiness Committee as minor or errata are incorporated into the current version of the guidelines as soon as they are resolved.

**Major Changes / Draft Status** – Changes that are classified, at the discretion of the ISA eBusiness Committee, as major changes will be included in the next release of the guidelines and identified with a “draft status.” This is an indication to the implementer that this change is new and may be subject to modification as the ISA eBusiness Committee receives feedback. The draft status is removed after two versions (one year later) if no major modifications are requested for sections in draft status.

**Change Request Notification** – Change Requests prior to resolution and, again, once a resolution has been achieved, are:

- Published in the ISA eBusiness electronic newsletter.
- Sent via e-mail to the eBusiness contacts in the ISA database for ISA member companies (including solution providers).
- Available on the ISA Web site.

**Change Request Form (Appendix B)** - Information gathered on the CR Form include:

- Company name, contact name, contact information of a current member of the ISA (membership dues are paid)
- A simple description of the change
- The business process associated with the change
- A commitment to implement (Trading Partners and time frame)
- Guideline chapters affected by the change
- Documents may be attached to help explain the CR

## Change Request Process

- 1) Change Requests are submitted via the ISA Web site, by mail, or by fax.
- 2) The ISA eBusiness Committee receives all Change Requests.
- 3) Change Requests will only be entertained if there is an earnest intent to implement the change by the requester and at least one trading partner.
- 4) The ISA eBusiness Committee may determine that the functionality requested already exists. If so, the existing methodology is explained to the requester and the request is respectfully denied.
- 5) Change Requests are classified as “Major,” “Minor,” or “Errata” (typographical errors).
- 6) So that ISA membership may have a chance to comment, information on new change requests are published in the ISA eBusiness newsletter, the ISA eBusiness Guidelines section of the ISA Web site and sent, via e-mail, to the eB contact at each ISA member company.
- 7) Errata and Minor changes are incorporated into the current version as soon as they are resolved.
- 8) Changes as a result of a major change request are not part of the Guideline until the next publication date, and then they are in a Draft Status for one year.
- 9) The ISA eBusiness Committee will determine if there is a need to create an ad hoc Working Group to make recommendations regarding the CR. The ad hoc committee is disbanded after their work on a Change Request, or group of Change Requests, is finished.
- 10) The ISA eBusiness Committee will work with the submitter of the CR to determine a mutually agreeable time to discuss the CR, preferably during a regularly scheduled ISA eBusiness Committee teleconference call. If the submitter or a representative of the submitter is not on the phone call, the eBusiness Committee will decide if they still want to act on the CR during that conference call. If the ISA eBusiness Committee elects to wait for the submitter to discuss the CR, the submitter will be contacted for a second opportunity. If the submitter or their representative is not present at the second scheduled conference call, the ISA eBusiness Committee may decide to act on the CR or consider it withdrawn.
- 11) The eBusiness Committee must decide if approving a CR will affect the installed base. If so, sunrise/sunset dates will be established for the transition.
- 12) If a change request requires a change to the ANSI X12 EDI standards or GS1 General Specifications© that CR will be brought to the appropriate standards body (either by the submitter or an ISA representative) before it can be incorporated into the ISA eBusiness Implementation Guideline.
- 13) A two-thirds majority of the voting ISA eBusiness Committee members will be needed to pass a CR. (i.e., a non-vote is neither a yes nor a no). It is appropriate for the eBusiness Committee members to see how the other members voted. Anyone voting against a change request is obligated to explain why.
- 14) If a CR is rejected, the submitter will be provided with a reason for the rejection.

## eBusiness Terms & Concepts

The following terms will be used throughout the guidelines and include the major building blocks of the ISA's electronic business strategy. Before reading this Guideline, please familiarize yourself with these terms and concepts. A more exhaustive glossary is included in Appendix A.

**GSI (Formally EAN/UCC)** - GSI is the name given to the global standards organization made up of EAN-International and the Uniform Code Council. Using the Global Standards Management Process (GSMP), users create global standards for Automatic Identification and Data Capture (AIDC) and Electronic Business Transactions (EBT). AIDC technologies include bar codes and radio frequency identification (RFID). Electronic Business Transaction types include Electronic Data Interchange (EDI) and eXtensible Markup Language (XML). The electronic exchange of data relies on the ability to uniquely identify trade items and trading partners, which is accomplished by assigning each company one or more unique company prefixes. This company prefix is used to create unique Global Trade Item Numbers and Global Location Numbers. GSI-US, a Member Organization of GSI, manages company prefixes for the U.S. Likewise, GSI-Canada manages company prefixes for that country. More information can be found at [www.gs1.org](http://www.gs1.org), [www.gs1ca.org](http://www.gs1ca.org), and [www.gs1us.org](http://www.gs1us.org).

**GSI Keys** - GSI has created a system of keys that allows a trading partner to identify items, locations and assets in a globally unique way throughout the open supply chain. In the United States, this is managed by GSI-US, formally the Uniform Code Council, ([www.gs1us.org](http://www.gs1us.org)). In Canada, it is managed by GSI-Canada ([www.gs1ca.org](http://www.gs1ca.org)). Once a company obtains a company prefix, the user company can combine it with a reference number to identify individual trade items, physical locations, legal entities and assets. This unique identifying number is used to look up information about that item, location or asset in a database or business application system.

**Open Supply Chain** - The open supply chain is a business environment where products, transactions and funds are exchanged amongst multiple and various trading partners and their attendant ancillary services such as transportation carriers, third-party warehouses, customs and border patrol, outside sourcing, etc. When a product leaves the physical domain of the owner, it is best business practice to assign unique trade item numbers, logistics serial numbers, ship-to location numbers, bill of lading numbers, etc. This facilitates tracking, tracing, inventory management, shipping, receiving, customer service and returns. This is especially important in the open supply chain when other companies handle trade items, but are not privy to the specific trading relationship between the buyer and seller with respect to data alignment, purchasing and shipping information.

**EDI** - Electronic Data Interchange is the exchange of regular business documents such as purchase orders and invoices, using a standard file format. In North America, the American National Standards Institute maintains these file formats. Using the ANSI X12 EDI standards, different industry groups write implementation guidelines explaining how the standards will be used relative to their specific industry. Outside of North America, companies use UN EDIFACT EDI standards. EDIFACT structure and syntax differs from ANSI X12 EDI, and is not addressed in the ISA eBusiness Guidelines.

**eXtensible Markup Language (XML)** - XML is a markup language for defining, validating and sharing documents containing structured information. XML provides a file format for representing data, a schema for distinguishing and describing data structures and a mechanism for extending and notating HTML (the "language of the Internet"). Unlike HTML, with XML, tags can be designed for specific purposes. The ISA eBusiness Guideline uses the core XML transactions approved for use by GSI.

**Trade Item** - A Trade Item is any item upon which there is a need to retrieve pre-defined information and is priced, or ordered, or invoiced at any point in any supply chain.

Consumer Trade Item - An individual trade item intended to be sold at point of sale (POS).

Standard Trade Item Group - A standard composition for a trade item or items, not intended for point-of-sale scanning.

**Global Trade Item Number (GTIN)** - The GTIN is used to globally and uniquely identify trade items sold, delivered, warehoused, and billed throughout the supply chain. The use of a GTIN eliminates the need for managing part number cross-reference files. Confusion is created when a single trade item has many different part numbers (manufacturer's number, catalog number, customer number, etc.). Conversely, errors result when different trade items from different manufacturers, coincidentally, have the same part number.

A GTIN is created using a GS1 company prefix assigned to the Brand Owner of the item, along with an item reference number created by the Brand Owner, followed by a check digit. The family of GTIN includes the UCC-12 (U.P.C.), EAN-13 (GTIN-13), EAN-8 (GTIN-8) and EAN/UCC-14 (GTIN-14). U. S. manufacturers will assign the UCC-12 and EAN/UCC-14 GTIN. North American distributors may see the full range of GTIN if they purchase goods for resale from non-North American suppliers. Although a date has not been finalized, GS1-Canada will issue GS1 company prefixes used to create an EAN-13 GTIN.

**Global Location Number (GLN)** - The Global Location Number provides a globally unique and standard means to identify legal entities (a trading partner, buyer, seller, company, subsidiary or division) and physical entities (building, store, warehouse, or dock door) to support the electronic exchange of business data. GLNs are created using a GS1-assigned company prefix and a location reference number (created by the owner of the location), plus a check digit.

**Logistics Unit** - Logistics units are units that store or transport any combination of trade items which need to be identified and managed through the open supply chain. Examples include cartons, pallets and overseas containers.

**Serial Shipping Container Code (SSCC)** - The Serial Shipping Container Code (SSCC) is a unique license plate number for each logistics unit. Two cartons may contain the same GTIN but will have different SSCCs. The SSCC will tie the logistics unit to shipment data in an electronically exchanged ship notice.

**Automatic Identification Data Capture (AIDC)** - Automatic Identification Data Capture includes various methods for capturing the GTIN and GLN. AIDC technologies include bar codes and Radio Frequency Identification (RFID).

# Chapter 1.0

## The Trade of Goods and Services

### CORE BUSINESS PROCESSES

#### Plan the Business Relationship

Initially, the buyer and seller make contact and set up a business understanding before trade can proceed. Master Data is exchanged. Master Data includes basic business information such as contracts, routing guides, trading partner agreements, payment terms, product catalogues, price lists, business contacts, locations, names, addresses, and item information.

#### Align Data

Once good, clean master data is exchanged, a process must be established for maintaining this data both within a company and between trading partners. All other business processes depend on this step. The quality of master data alignment is the single biggest factor in the success of the Order, Deliver and Pay processes.

#### Order

The order process is where specific products, services, and quantities are defined at given prices, and for delivery at specific places and times.

#### Deliver

Delivery is the process of organizing goods to meet an order, moving the goods to the agreed location and reconciliation that the goods are in accordance with the order.

#### Pay

Payment is both the process of determining the correct payment and the actual transfer of funds.

# Chapter 2.0

## GS1 Keys

This chapter covers the concept of GS1 (EAN/UCC) keys to identify items, locations and assets, including Global Trade Item Numbers, Custom Industrial Supply Items, Global Location Numbers, Global Returnable Asset Identifiers, and Global Individual Asset Identifiers.

### 2.1 GS1 Key Components

GS1 maintains a system of keys, which allows trading partners to identify items, locations and assets in a globally unique way throughout the open supply chain. In the United States, this is managed by GS1-US ([www.gs1us.org](http://www.gs1us.org)). In Canada contact GS1-Canada ([www.gs1ca.org](http://www.gs1ca.org)). A manufacturer or distributor must purchase a GS1 company prefix which uniquely identifies that company. The user company can then combine it with a reference number determined by the user company, to identify individual trade items, physical locations, legal entities and assets. Once a unique identifying number is created, trading partners may use that identification number to store and look up information about that item, location or asset in their business application systems.

#### GS1 Key Components

Every GS1 Key is comprised of the following:

- A GS1 Company Prefix
- A reference number

Many GS1 Keys also include:

- An Indicator or Extension Digit
- A Mod 10 Check Digit

All GS1 Keys are associated with an Application Identifier, which is technically not part of the data that comprises the key, but is used to identify the type of key in a bar code.

**GS1 Company Prefix** - A distributor or manufacturer becomes licensed to use a company prefix assigned by the appropriate GS1 Member Organization. There are guidelines in the GS1 General Specifications® regarding the use of a company prefix when a line of products, a division or an entire company is bought or sold to another company. It is important to notify GS1 when the transfer of a company prefix license occurs. The annual revenue of the user company determines the cost of the prefix.

A GS1 Company Prefix is variable in length. Many assigned by GS1-US are six or eight digits long. Since the total field length of a GS1 key is usually fixed, a longer company prefix will mean that a user company can uniquely identify fewer items or locations. For example, with a six-digit company prefix, a user company can identify 100,000 trade items. With an eight-digit company prefix, a user company can create 1,000 part numbers.

A User company may license more than one company prefix if it has too many items or locations for one company prefix.

**GS1-US (U.P.C.) Company Prefix** - A U.P.C. Company Prefix is assigned by GS1-US and is used to create a UCC-12 GTIN which, in turn, can be represented in a U.P.C. bar code. A GS1-US company prefix (U.P.C. company prefix), becomes an international GS1 company prefix when an additional zero is used in the left-most position of the company prefix. The additional zero is often referred to as the GS1 country code. A U.P.C. company prefix is converted to a GS1 company prefix for all GS1 keys except the UCC-12 GTIN.

GS1-US maintains a bank of company prefixes that can be used to assign EAN-13 Global Trade Item Numbers. Indications are it will not assign these company prefixes for many years, and when it does start to assign these keys, the organization will announce a sunrise date well in advance of their use.

**Reference Number** - The Brand Owner of the item, location or asset assigns the reference number, used in conjunction with its company prefix, to create globally unique identification numbers. It is best to avoid building an “intelligent” number, which attempts to convey something about the object or location. An example would be using the same beginning digit to identify all items manufactured at a certain location. Rather than building meaning into an identification number, a GS1 Key should simply be a unique number which provides an unambiguous way to look up attributes in a database or business application.

**Brand Owner** - The Brand Owner is defined as the company using its GS1 Company Prefix and assigning the reference number for an item (it must always be the same company). When the manufacture of an item is outsourced to another company, the Brand Owner is the company that owns the intellectual property and the rights to that item.

**Application Identifiers (AI)** - GS1 maintains a list of Application Identifiers for each GS1 Key and other various data elements. An Application Identifier is a two- to four-digit number, used primarily in AIDC technologies such as bar codes, to identify the type of data carried in the bar code. Application Identifiers exist for Global Trade Item Numbers, Global Location Numbers, Serial Shipping Container Numbers, Bill of Lading Number, Expiration Date, Batch/Lot Number, Quantity, and so on. See Appendix D for a list of Application Identifiers.

**GS1 Key Indicator Digit or Extension Digit** - Some GS1 Keys have an additional number at the beginning of the key used to further distinguish that item or unit load.

**GS1 Key Check Digit** - Numeric GS1 Keys make use of a Mod 10 Check Digit. The algorithm for this check digit is given in Appendix C. The Check Digit ensures that the number has been read (decoded) correctly. The Check Digit should always be stored with the rest of the key.

## 2.2 Trade Items

A trade item is any item (product or service) upon which there is a need to retrieve pre-defined information and is priced, ordered, or invoiced at any point in any supply chain. Although not as critical in the industrial supply channel, trade items are defined as either “Retail Consumer Trade Items” or “Standard Trade Items.” A Retail Consumer Trade Item is one that may be scanned at a Point-of-Sale (POS) device. While many types of bar code symbols can carry the trade item number of a Standard Trade Item, a Retail Consumer Trade Item can only use a bar code type that is globally approved for a point-of-sale device. Presently, that is limited to EAN/UPC symbology and a UCC-12 data structure for U.S. manufacturers and an EAN-13 data structure in Canada. Please see Chapter 3 for more information on the use of bar codes in the ISA supply chain.

## GTIN - Global Trade Item Number

The GTIN is used to globally and uniquely identify trade items sold, delivered, warehoused, and billed throughout the open supply chain. The use of a GTIN eliminates the need for managing part number cross-reference files. Confusion is created when a single trade item has many different part numbers (e.g. manufacturer's number, catalog number, customer number, etc.). Conversely, errors result when different trade items from different manufacturers, coincidentally, have the same part number.

**GTIN Allocation Rules** – Each unique item must have its own GTIN. Basically, two items or two versions of an item cannot have the same GTIN if one cannot, in every situation, be substituted for the other. A new GTIN should be assigned to an item when any one dimension of the item changes by more than 20%. Note that a change in price is not a reason to change a GTIN unless the price is printed on the item. Please see the GS1 General Specifications<sup>®</sup> for more information on GTIN Allocation Rules ([www.gs1.org](http://www.gs1.org)).

**Re-using a GTIN** - GS1 provides guidance for re-using a GTIN 48 months after an item is declared obsolete or last supplied. This is applicable for end-consumer items such as groceries or mass merchant products, particularly fashion items, as they eventually “wash out” of the supply chain. However industrial supplies, sold business-to-business, to be used for maintenance, repairs, operations and production should be given additional consideration. A company may refer to an industrial supply trade item years after it was last supplied. A distributor or manufacturer may need to track, trace or re-call a trade item. **As a general rule, GTINs assigned to an industrial supply trade item should never be re-assigned to another (different) item.**

**GTIN Structure** - A GTIN is created using a GS1 company prefix assigned to the Brand Owner of the item, along with an item reference number assigned by that same Brand Owner, followed by a check digit.

## Non-GTIN Items

Items that are not considered Trade Items, and therefore do not receive a GTIN, include the following:

- Items that may be shrink-wrapped or bundled together merely to facilitate the manufacturing process.
- Individual items in a container (plastic bag or box) not intended for individual sale. An example would be small candy bars in a bag. The bag of candy is the smallest selling unit.
- Logistics units are units assembled simply for transporting any combination of trade items. That combination of trade items may be different every time the items are shipped. Examples include cartons, pallets and overseas containers. Logistics units are marked with a Serial Shipping Container Code, which acts as a unique license plate number for each logistics unit. Cartons which contain the same trade items will each get a different SSCC.

## The Family of GTIN Data Structures

The family of GTIN includes the UCC-12 (U.P.C. or GTIN-12), EAN-13 (GTIN-13), EAN-8 (GTIN-8) and EAN/UCC-14 (GTIN-14). U.S. manufacturers will use the UCC-12. Canadian manufacturers currently use the UCC-12 and the EAN-13. Both U.S. and Canadian manufacturers may assign EAN/UCC-14 to cases of like items. North American distributors may see the full range of GTIN if they purchase goods for resale from non-U.S. suppliers.

The UCC-12 data structure is comprised of a GS1-US (U.P.C.) Company Prefix, an item reference number and a check digit. This GTIN may be used to identify a single trade item or a trade item grouping, and may be conveyed in several types of bar code symbology.

UCC-12	Variable Length GS1-US U.P.C. Company Prefix + Item Reference = 11	Check Digit
	N <sub>1</sub> N <sub>2</sub> N <sub>3</sub> N <sub>4</sub> N <sub>5</sub> N <sub>6</sub> N <sub>7</sub> N <sub>8</sub> N <sub>9</sub> N <sub>10</sub> N <sub>11</sub>	N <sub>12</sub>

The EAN-13 data structure is comprised of a GS1 Company prefix assigned outside of the U.S., plus an item reference and a check digit. It is used in the same way the UCC-12 is used in the U.S.

EAN-13	Variable Length GS1 Company Prefix + Item Reference = 12	Check Digit
	N <sub>1</sub> N <sub>2</sub> N <sub>3</sub> N <sub>4</sub> N <sub>5</sub> N <sub>6</sub> N <sub>7</sub> N <sub>8</sub> N <sub>9</sub> N <sub>10</sub> N <sub>11</sub> N <sub>12</sub>	N <sub>13</sub>

The EAN-8 data structure is comprised of a special GS1-8 Company prefix, assigned outside the U.S., plus an item reference number and a check digit. It is comprised of eight digits. It is assigned by GS1 Member Organizations for very small items.

EAN-8	GS1-8 Prefix    Item Reference	Check Digit
	N <sub>1</sub> N <sub>2</sub> N <sub>3</sub> N <sub>4</sub> N <sub>5</sub> N <sub>6</sub> N <sub>7</sub>	N <sub>8</sub>

The EAN/UCC-14 data structure is used globally and begins with Indicator Digits 1-9. Indicator Digits 1-8 are used for marking a fixed measure GTIN comprised of multiples of the same UCC-12. Indicator Digit 9 is used for variable measure and custom industrial supply trade items.

EAN/UCC-14	Indicator Digit 1-9	GTIN of the Items Contained (Must recalculate the check digit)	Check Digit
	N <sub>1</sub>	N <sub>2</sub> N <sub>3</sub> N <sub>4</sub> N <sub>5</sub> N <sub>6</sub> N <sub>7</sub> N <sub>8</sub> N <sub>9</sub> N <sub>10</sub> N <sub>11</sub> N <sub>12</sub> N <sub>13</sub>	N <sub>14</sub>

When using an EAN/UCC-14 to identify multiples of UCC-12s, the GS1 Company Prefix is used (N2 is zero). A GS1 Company Prefix is the GS1-US (U.P.C.) Company Prefix with an additional zero (the “country code”) added to the left most position of the company prefix. In other words, the single selling GTIN is marked with a UCC-12. The “case pack” GTIN is comprised of any indicator digit 1-8, plus a zero, then the first 11 digits of the UCC-12 plus a re-calculated check digit. As noted below, a case or inner pack may instead be identified with a unique UCC-12 (a different UCC-12 from the one assigned to the item contained in the case).

**Using UCC-12 to Mark Cases and Inner Packs** - It is not necessary to create an EAN/UCC-14 for standard case packs. In fact, if that case pack will ever be scanned at point of sale, or if it contains a standard mixed assortment of UCC-12s, the pack must be assigned a unique UCC-12. For U.S. manufacturers, the simplest GTIN strategy for a trade item is to give each unique trade item a UCC-12. (This will, however, impact the number of items that can be identified with a single company prefix.) A trade item can be a single selling unit, a standard assortment of the same selling unit, or a standard mixed assortment of more than one single selling unit. An item or collection of items is given a GTIN when it is bought and sold in that configuration.

**Marking a Case Pack with the UCC-12 Plus the Quantity Inside** - In the industrial supply sector, a standard case pack of an item can also be marked with the UCC-12 contained in the pack, plus the quantity contained, represented in a bar code on the outside of the carton. In this instance, the case pack is considered a logistics unit and the Application Identifier for the GTIN is (02) *GTIN of Trade Item Contained in a Logistics Unit*, rather than (01) *GTIN*. The quantity in the case or inner pack is identified

with a bar code using Application Identifier (37) *Count of Trade Items Contained in a Logistic Unit*. Since this is considered a logistics unit, the SSCC is also included on the label. See Chapter 3 for more details.

**EAN/UCC-14 Indicator Digit 9 Variable Measure or Custom GTIN** - When the Indicator Digit in an EAN/UCC-14 is 9, the GTIN is variable measure or a custom industrial supply item. Indicator Digit 9 is used when additional information is needed to complete the item identification because it is variable measure (i.e. sold by the pound) or a custom item. When identifying a variable measure trade item, the appropriate Application Identifier and data providing the additional information, such as weight or length or made-to-order variation number, follow the EAN/UCC-14.

## 2.3 Custom Industrial Supply Items

Custom Industrial Supply Items are one-of-a-kind, made-to-order items that are sold from business to business, and will not be scanned at a point-of-sale device. They are used in maintenance, repairs, operations or production. Examples include custom abrasive belts, special adhesives, and made-to-order cutting tools needed for a specific machine and cutting application. Their specifications may be called out in a series of blue prints or other technical documents. They may also be called out in a request-for-quote process or they may accompany the purchase order.

**If a custom industrial supply item will be re-sold in the open supply chain or scanned at a point of sale device, then it must be assigned a UCC-12.**

The following methodology uses a base article number followed by a made-to-order variation number. The combination of the base article number and the made-to-order variation number allows the manufacturer to make efficient use of its GS1 Company Prefix by using the same base article number to identify thousands of custom industrial supply items. (They are distinguished one from another by the Made-to-Order Variation Number.) Since custom industrial supply items are not likely to be manufactured again, it is not practical to diminish a manufacturer's GTIN pool by assigning them each a unique UCC-12. However, it is important to note that a manufacturer may choose to assign every unique trade item, customized or not, a UCC-12.

**Base Article Number** - A manufacturer can create an EAN/UCC-14, starting with 9, to indicate a base article number. That base article number can be listed in the manufacturer's catalog to indicate a customized configuration of this article can be ordered. The base article number may also be used in a Purchase Order when the specifications for this variation of the custom industrial supply item have been exchanged, either prior to, or with the purchase order. The base article number alone (without a *Made-to-Order Variation Number*) will never appear in a bar code or on an invoice, because no physical item exists with that trade item number.

**Made-to-Order Variation Number** - When the agreement is made to manufacture the custom industrial supply item, the manufacturer will assign a *Made-to-Order Variation Number* which will identify this version of the custom item (base article number). The base article number plus the variation number is communicated to the customer on the purchase order acknowledgment, in the response to the request for quote, or using some other mutually agreed upon method. The base article number together with the variation number may appear in a bar code on the item package, and should be used on the invoice and with the shipment notification.

The *Made-to-Order Variation Number* can only be used with an EAN/UCC-14 Indicator Digit 9. It is variable length, numeric, up to six digits. Those trading partners who wish to store the base article number and variation number concatenated in the same field would, therefore, need to provide for a data field up

to 20 digits (without special characters or spaces). A *Made-to-Order Variation Number* may **not** be used with an EAN-8, EAN-13, UCC-12 or an EAN/UCC-14 Indicator Digit 1 through 8. The *Made-to-Order Variation Number* will never appear alone (it is meaningless without the associated base article number). The GS1 Application Identifier for a Made-to-Order Variation Number is (242). The Application Identifier is used in bar codes to identify the type of data in the bar code.

**Base Article Number Strategy** - Each manufacturer will determine its custom industrial supply item numbering strategy. A manufacturer may decide to use one base article number (EAN/UCC-14, Indicator Digit 9) for all custom industrial supply items. Or it may use a different base article number for each type of custom item, or even create classifications within a custom industrial supply item type.

Examples of Base Article Number Assignments for Custom Items:		
Strategy	Base Article Number	Description
Use one GTIN to represent all custom items	9061414100012	Customized Product
Use a GTIN to represent each category of custom trade items	90614141111114	Custom Abrasive Belts
	90614141222223	Custom Abrasive Sheets
	90614141333332	Custom Abrasive Pads
Use a GTIN to represent a type of custom trade item within a category	9061414100029	Custom Abrasive Belts – 1 to 2” wide
	9061414100036	Custom Abrasive Belts – 2 to 3” wide

### GTIN Transition Strategy

Currently, a trade item in the industrial supply channel may have several part numbers associated with it. There is certainly a manufacturer’s part number, and often a distributor and / or catalog part number. Creating one universal and globally unique part number has several advantages:

- Provide unique and reliable identification of a trade item in the open supply chain
- Eliminate errors associated with cross-reference look-up tables
- Allow the same part number to be used for an item in all electronic documents and paperwork
- Simplify item identification and data alignment
- Allow the use of a bar code on the package

While the manufacturer and distributor transition to Global Trade Item Numbers, it will be useful to create a separate field for GTIN. It is certainly possible that, coincidentally, one company may assign a part number to an item that may be the same as another company’s GTIN. Labeling this field “GTIN” in databases and on paperwork will help to distinguish it as such. During the transition, electronic business transactions may carry the GTIN as well as alternate item reference numbers. Eventually, all other item reference numbers should be dropped and only the GTIN used.

**Using Bar Codes to Identify the Item** - Similarly, during the transition, item reference numbers may appear in two bar code configurations. The bar code carrying the GTIN can be identified by its data structure and bar code symbology. A UCC-12 can appear in a U.P.C. symbol. A UCC-12 or EAN/UCC-14 can appear in a UCC/EAN-128 bar code with Application Identifier (01) *GTIN* or (02) *GTIN of Trade Item Contained in a Logistics Unit*. (See Chapter 3 for more information.) If a company is currently using a proprietary part number, it can still use the GS1 system of Application Identifiers and a bar code. Application Identifier (241) *Customer Part Number* or (240) *Additional Product Identification Assigned by the Manufacturer* can carry the proprietary item number in a UCC/EAN-128 bar code.

**Storing GTINs in Internal Databases** - There has been some reference to storing all GTINs in a 14-digit data field, right justified and zero filled. This was put forward as one suggestion for storing GTIN and this methodology is not required. GTINs can be effectively stored in any size field equal to or greater than the size of the longest GTIN (8, 12, 13, or 14). Zero filling is not required to insure uniqueness of a GTIN. Manufacturers only using UCC-12s can store their GTINs in a 12-digit field, especially if a 12-digit field already exists in their business application. If systems are re-written to accommodate GTIN, there may be advantages to creating a 14-digit field as GS1 looks to expand GTIN. However, UCC-12 will continue to serve as a global trade item number for U.S. manufacturers for many years to come. Canadian manufacturers may begin to assign an EAN-13 GTIN for their trade items.

Trading partners who wish to use EAN/UCC-14s to identify inner packs and standard case pack of the same UCC-12 (or do business with those who do) must accommodate the data structure that uses 14 digits. An EAN/UCC-14 will always start with 1-9. Trading partners who sell or buy custom industrial supply items must also accommodate a 14-digit field, starting with 9. If a manufacturer sells custom industrial supply items, and will never sell a variable measure item (by the pound, inch, foot, volume, etc.) it may assume that an EAN/UCC-14 starting with a 9 will always represent a base article number denoting a custom item. If a trading partner wishes to concatenate the base article number with the made-to-order variation number, without special characters or spaces, and store it in one data field, the minimum field length would be 20 digits.

GS1-US Company Prefixes may start with a zero, which may be defined as “alpha” rather than numeric data in some databases. Also remember that a bar code scanner is a data entry device, and the UCC-12, as scanned from a U.P.C. bar code symbol, will only contain 12 digits.

Currently the ISA eBusiness Guidelines, relative to exchanging GTIN in EDI transaction sets, suggests exchanging UCC-12 in 12-digit format and EAN/UCC-14 in 14-digit format. Additional information about GTIN can be found in the GS1 General Specifications®.

## 2.4 Global Location Numbers

A Global Location Number provides a unique and standard means to identify legal entities (a trading partner, buyer, seller, company, subsidiary or division) and physical entities (building, store, warehouse, ship-to, ship-from, or dock door) to support the electronic exchange of business data. GLNs are created using a GS1 company prefix and a location reference (created by the owner of the location), plus a check digit. A GS1 Company Prefix is the U.P.C. Company Prefix assigned to U.S. companies, with an additional zero added in the leftmost position of the company prefix.

Global Location Number	Variable Length GS1 Company Prefix + Location Reference = 12	Check Digit
	N <sub>1</sub> N <sub>2</sub> N <sub>3</sub> N <sub>4</sub> N <sub>5</sub> N <sub>6</sub> N <sub>7</sub> N <sub>8</sub> N <sub>9</sub> N <sub>10</sub> N <sub>11</sub> N <sub>12</sub>	N <sub>13</sub>

Global Location Numbers are used for Ship-to Locations, where the GLN and location information are synchronized before purchase orders are exchanged. This allows the customer to simply send the GLN rather than all of the address information in each purchase order or PO change. Global Location Numbers can also be used as the Sender/Receiver ID in an EDI transaction.

**GLN Application Identifiers** – The following Application Identifiers are used with Global Location Numbers when the GLN is represented in a bar code.

- (410) – Ship to / Deliver to
- (411) – Bill to
- (412) – Purchased from
- (413) – Forward to
- (414) – Physical Location
- (415) – Invoicing Party

When conveying a GLN in EDI, different qualifiers identify the type of GLN in the transaction. Additional information about Global Location Numbers can be found in the GS1 General Specifications®.

### 2.5 Global Returnable Asset Identifiers

A returnable asset is a reusable package or piece of transport equipment such as a plastic pallet, tote or overseas container. The GRAI is identified with Application Identifier (8003) and is comprised of a GS1 Company Prefix, a reference number for the type of returnable asset, a check digit, and an optional serial number identifying that particular returnable asset.

A typical application using a GRAI would be tracking returnable plastic pallets (e.g. CHEP pallets). The owner of the pallet applies a bar code symbol carrying the GRAI with a permanent marking technique. This bar code symbol is scanned whenever the pallet is supplied to a customer with a unit load, and scanned again when it is returned. The GRAI is never used to identify the Unit Load itself (the platform and the product on the platform). A Unit Load is identified with a Serial Shipping Container Code (SSCC).

GRAI	AI	00 + GS1-US (U.P.C.) Variable Length Co. Prefix + Asset Type = 13	Check Digit	Serial Number (optional)
	8 0 0 3	0 0 N1 N2 N3 N4 N5 N6 N7 N8 N9 N10 N11	N12	X1 variable X16

The owner of the asset creates the asset type reference number. There is no standardized list of asset type reference numbers. The same asset type reference number should be used for all similar returnable asset types within that company.

### 2.6 Global Individual Asset Identifiers

The GIAI identifies an individual asset belonging to the company whose GS1 company prefix is used to create the GIAI. This methodology for creating a unique number for an individual asset is one of the acceptable methods for creating a Unique Identifier (UID) for the U.S. Department of Defense

A GIAI is variable length, alphanumeric, up to 30 characters. Because it can contain alpha data, it is not possible to calculate a check digit.

GIAI	AI	0 + GS1-US (U.P.C.) Variable Length Co. Prefix	Variable Length Alphanumeric Reference Number (optional)
	8 0 0 4	0 N1 N2 N3 N4 N5 N6 N7 N8	X1 variable X...

As with any key, it is best to simply make the GIAI a unique character string. Do not build in intelligence in the GIAI itself. The key is used to look up asset attributes and history in a database or application system.

# Chapter 3.0

## Using Bar Codes for Trade Items and Logistics Units

**Basic AIDC Terms and Concepts** – When communicating data in an Automatic Identification and Data Capture technology such as a bar code or RFID tag, the basic premise is the same. While this chapter emphasizes bar codes, all AIDC technologies consist of:

- **Data** – the actual data decoded from the bar code
- **Structure** – the structure of the data needed for a certain application or data carrier
- **Carrier** – the type of bar code symbology or other AIDC device

When data is decoded, the result is the same data, regardless of the carrier (type of bar code symbology or RFID tag) that held the data.

### 3.1 AIDC Terms

**Application Identifiers (AI)** - GS1 maintains a list of Application Identifiers for each GS1 Key and various other data elements. An Application Identifier is a two- to four-digit number, used primarily in AIDC technologies such as bar codes, to identify the type of data carried in the bar code. Application Identifiers exist for Global Trade Item Numbers, Global Location Numbers, Serial Shipping Container Codes, Bill of Lading Number, Expiration Date, Batch/Lot Number, Quantity, and so on. See Appendix D for a complete list of Application Identifiers.

**GS1 Key Check Digit** - Numeric GS1 Keys make use of a Mod 10 Check Digit. The algorithm for this check digit is given in Appendix C. The Check Digit ensures that the number has been read (decoded) correctly. The Check Digit should always be stored with the rest of the key.

**X Dimension** – The X dimension of a particular bar code symbology is the width of the thinnest space or bar. Bar codes should not be made significantly larger or smaller than their normative size. It impacts the readability of the bar code. For instance, U.P.C. symbology can be made 100% larger or 20% smaller than nominal, but sizes outside that range become difficult to read. Information on the width of the X Dimension for specific symbologies is available in the GS1 General Specifications®.

**Quiet Space** – Each of the three bar code symbologies discussed here require sufficient Quiet Space in order to read properly. As a rule, the quiet space is generally 10 times the size of the X dimension.

### 3.2 Types of Bar Code Symbology

The ISA eBusiness Guideline includes the use of three types of bar code symbologies.

**EAN/UPC** – Often referred to in the U.S. as U.P.C. symbology, this is an omni-directional symbology approved for point-of-sale devices. It does not carry an Application Identifier, as the only type of data U.P.C. symbology can convey is a UCC-12 GTIN. If an item is likely to be scanned at a POS device, the only option for a U.S. brand owner is to use a UCC-12 in a U.P.C. symbol. For more information on EAN/UPC symbology see the GS1 General Specifications<sup>®</sup>.



**ITF** – Interleaved Two of Five is a bar code symbology designed for ink jet spraying onto corrugated cardboard cartons. The data encoded must be an even number of numbers, and the bar code itself is enclosed by bearer bars, which are heavy bars either on the top and bottom, or on all four sides of the bar code. ITF symbology does not support Application Identifiers.

**ITF-14** is a special GS1 form of ITF symbology that encodes only Global Trade Item Numbers (GTIN) in a 14-digit format. That includes the UCC-12 GTIN padded to 14 digits with two zeros in the left most position, and the EAN/UCC-14. More information on ITF-14 can be found in the GS1 General Specifications<sup>®</sup>.



**UCC/EAN-128 Symbology** - This type of bar code is printed on labels and uses the full array of GS1 Application Identifiers.

UCC/EAN-128 symbology is a GS1 subset of Code 128. When encoding a GTIN, Application (01) is used and the GTIN is padded on the left with zeros to 14 places. When the data is decoded, it reverts back to the UCC-12 format without the two zeros. One of the major benefits of UCC/EAN-128 symbology is the ability to concatenate data. It is possible, for instance, to encode a GTIN and the Expiry Date of that GTIN, or the Lot / Batch Number. For more information on UCC/EAN-128 symbols, please see the GS1 General Specifications<sup>®</sup>.



### 3.3 Bar Codes Used to Carry GTIN

A Trade Item is any item (product or service) upon which there is a need to retrieve pre-defined information and is priced, or ordered, or invoiced at any point in a supply chain. The following lists the types of bar code symbology that may be used in the GS1 system, for a UCC-12, EAN-13 or an EAN/UCC-14 GTIN:

- UCC-12 or EAN-13 can be carried in EAN/UPC symbology. This is the only symbology approved for Point of Sale.
- UCC-12 can be printed on corrugated cardboard using ITF-14 symbology when padded with two zeros on the left, to 14 digits.
- EAN-13 can be printed on corrugated cardboard using ITF-14 symbology when padded with one zero on the left, to 14 digits.
- UCC-12 or EAN-13 can be represented in UCC/EAN-128 symbology with Application Identifier (01), when padded with zeros on the left, to 14 digits.
- EAN/UCC-14 GTINs can be carried in either ITF-14 or UCC/EAN-128 symbology.

### 3.4 Bar Codes Used on Logistics Units

Logistics units are units that store or transport any combination of trade items needing to be identified and managed through the supply chain. Examples include cartons, pallets and overseas containers.

Logistics units may be marked in one of two ways. Both use UCC/EAN-128 bar code symbology.

**SSCC** – Logistics Units may be identified with a Serial Shipping Container Code (SSCC), which is a unique license plate number for each logistics unit. Two cartons may contain the same GTIN but will have different SSCCs. The SSCC will tie the logistics unit to shipment data in an electronically exchanged Ship Notice/Dispatch Advice. GS1 guidelines suggest that a number used as an SSCC not be re-used for one year. Consideration must be given for logistics units that may be in the open supply chain for longer than one year. Trading partners may have additional restrictions on re-using an SSCC, particularly for the U.S. Department of Defense.

**GTIN + Quantity** – A carton of some quantity of the same GTIN may also be marked using UCC/EAN-128 symbology with Application Identifier (02) *GTIN of Trade Items Contained in a Logistic Unit* plus Application Identifier (37) *Count of Trade Items Contained in a Logistic Unit*, which conveys the quantity of the GTIN in the carton. Since this is considered a logistics unit, the Serial Shipping Container Code, a form of carton license plate number, should also appear on the carton.

### 3.5 Other Bar Code Methodologies

There are other bar code symbologies and super-sets of UCC/EAN-128 and ITF-14 used outside the GS1 system. Certainly, there may be appropriate internal uses for these bar code carriers and an industrial supply trading partner may be required to use them in other sectors such as automotive, aerospace and the U.S. Department of Defense. Following is a partial list:

**Code 39** – A company may choose to encode proprietary data, used within its own four walls, with Code 39 symbols. Examples include marking warehouse bin locations or associate employee numbers on badges. Code 39 can carry the full set of ASCII characters. Some industry sectors such as automotive and the U.S. Department of Defense use Code 39.

**Data Matrix** – Data Matrix is a high-density bar code symbology that may be used for direct part marking (etch or dot peen). Data Matrix holds a great deal of information in a relatively small footprint. It is used by the U.S. Department of Defense.

**PDF-417** – PDF-417 is another form of high-density bar code. It has been used in the public domain as a “Portable Data File.” It can hold up to 1,850 characters and may be used for things such as Data Safety Sheets.

**Code 128** – Code 128, as opposed to the more restrictive GS1 subset (UCC/EAN-128) is a continuous, variable-length alphanumeric symbology encoding the full ASCII 128 character set. It includes uppercase and lowercase alphanumeric data as well as special characters. Code 128 can be used in one of three versions:

- **Code Set A** - Includes all of the standard uppercase alphanumeric characters and punctuation characters together with the symbology elements (e.g., characters with ASCII values from 00 to 95) and seven special characters.
- **Code Set B** - Includes all of the standard uppercase alphanumeric characters and punctuation characters together with the lowercase alphabetic characters (e.g., ASCII characters 32 to 127 inclusive) and seven special characters.
- **Code Set C** - Code set C includes the set of 100-digit pairs from 00 to 99 inclusive, as well as three special characters. This allows numeric data to be encoded as two-data digits per symbol character.

**ITF** – Similarly, Interleaved 2 of 5 bar code symbology, which is used on corrugated cardboard boxes, could be used, in a proprietary way, to encode data strings other than the GTIN encoded in the GS1 version, ITF-14.

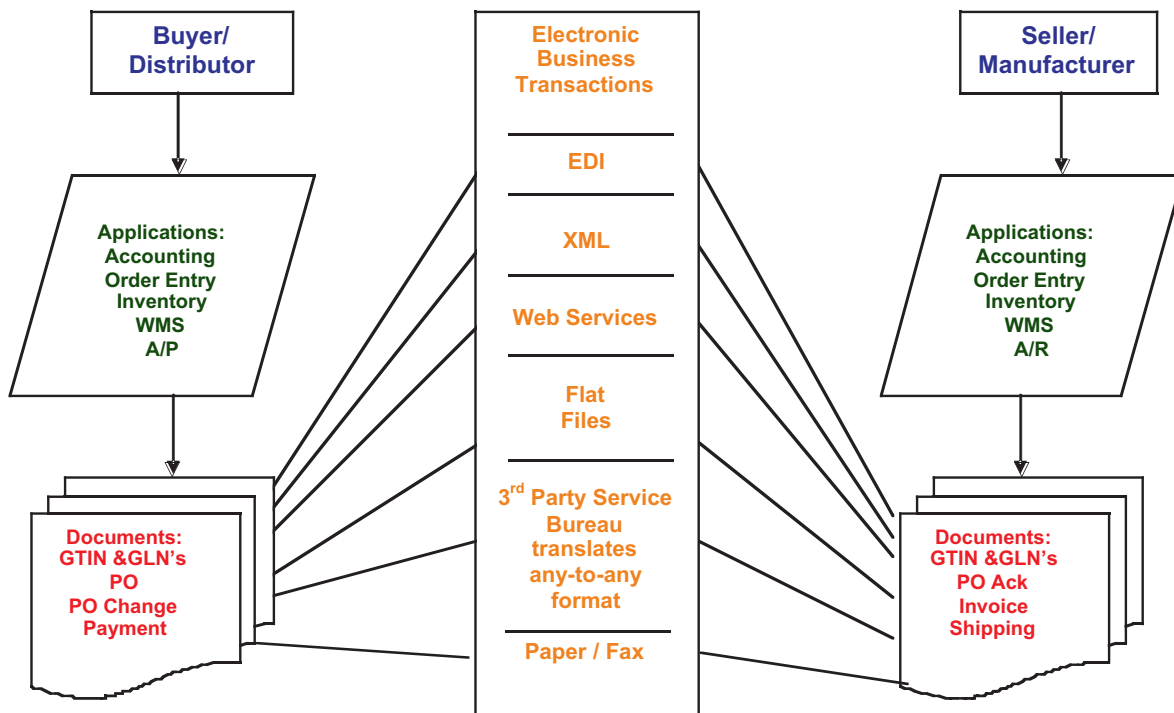
**Proprietary Part Numbers** - If a company currently uses a proprietary part number rather than a GTIN, it can still use the GS1 system of Application Identifiers and a bar code. Application Identifier (241) *Customer Part Number or Application Identifier* (240) *Additional Product Identification Assigned by the Manufacturer* can be used to carry the proprietary item number in a UCC/EAN-128 bar code.

# Chapter 4.0

## Electronic Business Transactions

Electronic Business Transactions (EBT) can take many forms. The ISA eBusiness Guideline provides a framework for standard business documents exchanged via EDI, XML and ISA Standardized Flat File formats. Internet e-forms and Web portals are not included in the ISA eBusiness Guideline. Generally, they are unique to the trading partner sponsoring the Web site (and therefore not standardized), and often do not provide a way to automatically integrate business transactions from application to application. There is usually some form of data entry involved. While this type of data exchange is not included in these guidelines, some trading partners may agree to use them.

Third-party solution providers also offer various tools and services for exchanging EDI or XML transactions. As with any outsourcing decision, a trading partner must evaluate the price / performance equation before deciding to use a service bureau.



### 4.1 Electronic Data Interchange - EDI

Electronic Data Interchange is the most popular method of electronically exchanging standard business documents today. EDI is the application-to-application exchange of regular business documents such as purchase orders and invoices, using a standard file format.

**EDI is Mature** - EDI is a mature and stable eBusiness tool. Tens of thousands of trading partners have created successful business applications exchanging documents in EDI, and indications are they will continue to maintain their EDI systems for many years. While the ISA EDI maps are relatively new, a

company may implement EDI knowing it is a proven technology with a sufficient life cycle to justify the time and expense.

It is important to note that, although the ISA eBusiness Guidelines contain EDI maps, the segments, elements and qualifiers exchanged may differ from trading partner to trading partner. This is especially true when exchanging EDI with trading partners in other industries, such as automotive, retail, and health-care. Even though there are variations in the transaction sets, all North American EDI will work from the same set of ANSI X12 rules for data structure and definitions.

**EDI Expense** - EDI becomes increasingly expensive as various trading partners differ from established industry guidelines. To the extent that ISA trading partners can adhere to the suggested EDI Segments, Elements and Qualifiers, EDI will be more affordable for all ISA member companies.

**EDI Format** - EDI file formats consist of segments of information, broken down into data elements, further identified with qualifiers. For example, a PO1 Segment in an 850 Purchase Order contains elements of information about the item being ordered including an item reference number, unit of measure and price. Qualifiers indicate whether an item number is a GTIN or a Vendor Number. Most EDI transactions consist of Header, Detail and Summary levels.

**ANSI X12** - in North America, the American National Standards Institute maintains these file formats. Using the same ANSI X12 EDI standards, different industry groups write implementation guidelines explaining how the standards will be used relative to their specific industry. ANSI maintains definitions, data types and minimum/maximum field lengths for the segments, elements and qualifiers used to construct business transaction sets. Individual industry groups select from them to create the transaction sets needed in that industry.

Outside of North America, companies use UN EDIFACT EDI standards. EDIFACT structure and syntax differs from ANSI X12 EDI, and is not addressed in the ISA eBusiness Guidelines.

**ANSI X12 Versions** – ANSI X12 publishes a new version of EDI each year. The latest version incorporates all of the changes that have been enacted during the previous calendar year. The ISA eBusiness Guidelines contains EDI maps for version 4010, which is the most popular version in use today, and version 5010, which is a more recent version. EDI implementers should be prepared to accommodate several versions of EDI, as their various trading partners will most certainly be using different versions.

ISA EDI transaction sets include:

Data Alignment Process

- 832 Item Set Up
- 816 Organization Relationships (Ship-to Locations)

Order Process

- 850 Purchase Order
- 855 PO Acknowledgement

Pay Process

- 810 Invoice

997 Functional Acknowledgement

## EDI Translators and Mappers

EDI is a standardized file format containing the business information needed for a particular business function such as order, pay or deliver. Commercially available EDI translation software is cost effective, and it is almost always better to purchase a software package than write your own. Good EDI translation software will allow a trading partner to exchange transaction sets in multiple X12 versions, using any variety of communication method, plus validate incoming and outgoing EDI transactions as being structurally correct. EDI translation software should also provide for sending, receiving and reconciling 997 Functional Acknowledgements.

EDI Mappers provide a tool to extract data from EDI transactions and map it into a company's business applications (e.g. open order, Accounts Receivable, Accounts Payable, etc.). Conversely an EDI mapper will take data from the business application and create outgoing EDI transactions. Business rules are usually built into the mapping process.

Unless the information received via EDI transactions is automatically integrated into a company's business application, the full benefit of EDI is not achieved. Systems that print out EDI documents and re-key them into their applications will not provide a return on investment.

## EDI 997 Functional Acknowledgements

A 997 Functional Acknowledgement is an EDI transaction set sent in response to all other EDI transactions. Its purpose is to notify the sender that:

- All EDI transaction sets have been received
- The transactions were processed by the receiver's EDI translator
- All mandatory segments and elements were present

It is imperative that an EDI recipient sends accurate and timely Functional Acknowledgements to their trading partners. It is best business practice to send a 997 within 24 hours of receiving an EDI transaction. It is equally critical for the sender of EDI transactions to reconcile functional acknowledgements to make sure every EDI transaction sent was received and accepted.

When an EDI transaction is accepted with an EDI Functional Acknowledgement, it does not imply that a trading partner agrees with or in any way acknowledges, in a business sense, the contents of the transaction. It merely means the EDI translator accepted it as a document that could be processed through to the application. Once the data is interrogated by a trading partner's business application, errors may be found in the business data. For example, a Purchase Order may be accepted with a 997 Functional Acknowledgement, but when it reaches the Order Entry system, it may have an invalid item number, unit of measure or price. A Purchase Order is acknowledged as an accepted and correct business document with an 855 PO Acknowledgement.

## Error Notification

**Functional Acknowledgement** - A 997 Functional Acknowledgement can be used to indicate syntactical errors in an EDI transaction when a mandatory or conditional segment or element is missing. However, a mandatory segment that is present may still contain incorrect data. The receiving trading partner's business application may identify errors in the business information or may encounter unexpected segments, elements, or qualifiers that cause the transaction to error out.

**Automated Error Notification** - The ISA eBusiness Guideline encourages the use of a PER Segment at the Header Level of every EDI document except the 997 Functional Acknowledgement. The PER

Segment contains Administrative Contact Information. This segment, sent in each transaction, provides contact information for the person who is to receive error or rejection notification for that transaction. The qualifier (IC) for Information Contact should be used when an error has occurred in the EDI syntax and (NC) for General Contact should be used when there is an error in the business data. If the same person serves both functions within a company, use the IC qualifier.

Minimally, this PER error notification contact segment should contain the person's name and a telephone number, plus either their fax number or e-mail address. Where possible, trading partners should automate a system of timely error notification, sending a fax or e-mail automatically when an EDI message errors out of their system. Error notifications should indicate whether they are:

- Fatal Errors - The receiver of the document rejected the transaction and a new one must be sent in its place as soon as possible. The new transaction is sent with a Transaction Type Code of (00) Original.
- Non-Fatal - Errors have been encountered, but the transaction will be processed. Please fix this type of error on future transactions.

## ISA EDI Code Lists

The ISA eBusiness Committee has created two types of EDI qualifier and identifier code lists: "Limited" and "Suggested." ANSI X12 EDI Code lists have hundreds of codes, used by every industry, which can identify Unit of Measure, Document Type, Product Identifiers, and so on.

A "Suggested" list provides the most often used codes, but the ISA does not intend to imply that the use of that data element is limited strictly to that code list. It is provided as a guideline, especially for those companies that may not have access to the complete set of ANSI X12 data elements. Additionally, in many cases the X12 code list contains redundant codes, that is, two or more codes that may be used in the same situation. This causes unnecessary confusion when a company tries to map these codes to its business applications. The ISA provides a suggested code to be used in that case.

If there is a pressing need for a trading partner to use a different code for a specific business application, they may decide to select additional codes from the ANSI X12 standards. An example would be the *Contact Function Code* used in the *PER Administrative Communications Contact* segment. This segment is intended to convey contact information about company personnel. ISA has selected several codes, including EDI Coordinator, Traffic Administrator, Buyer Name, etc. If a trading partner wishes to send information for a job type not listed, they may choose to reference the complete list of 230 codes to select a more appropriate code, or use something generic from the Suggested list, such as General Contact. Trading partners must mutually agree to use codes that are not listed in the ISA EDI Guideline. If a Trading partner receives an unexpected code, the transaction set may error out of their system for manual processing.

The other type of code list is "Limited." The ISA EDI Guideline intends for these lists to limit the codes to only those provided. An example would be to limit the scope of a transaction by only providing the capability to Add or Delete a piece of information. The change or replace process can become very complicated, especially when each trading partner uses a different methodology. The ISA EDI Guideline provides a method for deleting an unwanted or obsolete piece of information with a Delete code and replacing it, when necessary, with the Add function.

Because the ISA eBusiness Guidelines are voluntary, Trading Partner Agreements may override the concept of a Limited Code List. Two trading partners may elect to use any variety of codes available to them.

In a few instances, the ISA EDI Guidelines limit the codes used in a particular segment. This is to accommodate some of the “flat” commercial off-the-shelf ERP software packages. It allows for a simple one-to-one mapping. For instance, in segments where Product / Service ID Qualifiers are expressed, the first iteration of the Product / Service ID Qualifier is always either the GTIN or the Vendor’s Item Number. It is used to establish the primary item reference number that should be used on all business transactions. Subsequent iterations of the Product / Service ID Qualifier may convey item attendant information such as Engineering Change Level, Batch Number, Country of Origin, etc.

It is important to note that restricting the list of expected codes from a trading partner makes the mapping process from EDI to various business applications much more reliable. In some cases, an EDI transaction may “error out” if an unexpected (unmapped) code is encountered. In that case, the transaction must be handled manually. Whenever possible, it is best to use the codes listed in the ISA eBusiness Guidelines. In cases where a code that is not listed is often used among the ISA membership, it is important to submit a change request and have the code added to the guideline.

### Add / Change / Delete Methodology

One of the more challenging functions in electronically exchanging information is updating or changing data. This includes purchase order and invoice information plus item (catalog) and company master data.

**Item and Company Information Changes** - The ISA eBusiness Guideline suggests the most straightforward way to change information about an item in a sales catalog is to delete the item and then add the item with the new information, using qualifiers for Add or Delete at the Header Level of the 832 Product Catalog. This means that all of the items in a particular 832 transaction set will be deleted or added, rather than mix them in one transaction. It is, therefore, important to process a transaction containing items to be deleted before processing “Adds.” Any transaction using the Add or Delete function should be date and time stamped to aid in this process (e.g. transaction sets with information to be deleted should be date/time stamped before transaction sets with add information). The same is true of Party information (address and contact information) for an operating unit within a company.

**Purchase Order and Invoice Changes** – Distributors can change Purchase Orders using the 860 PO Change transaction set. Suppliers can modify POs using the 855 PO Acknowledgements. To change an invoice, a supplier should ask the customer to delete the original invoice, and then send a new invoice in its place.

### Header vs. Detail information

When a transaction set provides for the same data at both the Header and Detail Level, data sent at the detail level will override Header Level data for that detail item. For example, Country of Origin may be sent at the Header Level in an 832 Price Sales Catalog when the Country of Origin is the same for most of the items listed. If the Country of Origin is different for one or two items, it may be indicated at the Detail Level for just those items.

### Free Form Descriptions and Note Segments

Description and Free Form elements should always be used with caution. It is very difficult to automatically process free form data from application to application except to simply populate a field intended for human use. Business rules that are automatically processed must be identified with qualifiers. For example, when indicating that a trade item will not be available until a certain date, that data should be

sent in the appropriate Date / Time Segment and qualified with an “Effective” code. The PID - Product Description field should not contain verbiage to the effect: “This product not available until Q1 '07.”

Trading partners may resort to placing proprietary information in free form elements when the necessary codes are not available. The ISA eBusiness Committee provides a simple and effective way to add the codes needed through the ISA eBusiness Guideline Change Request Process. Please see page 8.

### Test and Production EDI Transactions

The ISA eBusiness Guidelines recommends using the ISA15 element in the ISA segment to indicate whether a transaction is test (“T”) or production (“P”). Each transaction received by a trading partner should be immediately interrogated to see if it is test or production before it is processed.

In order to thoroughly test a system, actual data should be transmitted through the same VAN or EDI/INT connection used for production. Often, data sent to a third-party solution provider for “testing” does not test either trading partner’s system. The data should be processed through both trading partners’ business application. It is important to test more than EDI syntax. Item setup, open order, accounts payable and accounts receivable are among the systems that should be tested. One method that may be used is to mutually set up four or five test trade item numbers and exchange purchase orders, PO changes and invoices for those items. This will allow trading partners to rigorously test their systems without accidentally shipping real products. It may be best to initially send a one-line PO, followed by a test PO with multiple lines and scenarios including canceling and changing all or part of an order.

Test documents should always relate to each other. In other words, the purchase order should be referenced in the PO Acknowledgement and any changes, either from the PO Acknowledgement or a PO Change, should be reflected in the invoice.

Trading partners may want to consider bringing up all transaction sets at once rather than one at a time so they can all be integrated and tested at once. Always maintain the ability for a trading partner to re-test after they are in production. A trading partner may want to request a test document if they make changes to their EDI system or business applications, while remaining in production.

Trading partners should establish minimum criteria for completing the test phase. This may be accomplished with two or three exchanges of the transaction sets involved. Basically, when the receiver of the transaction set indicates they are ready, the systems can be switched to production.

The error notification system, using the contact information in the PER segment of an EDI transaction should also be tested.

## 4.2 Extensible Markup Language – XML

XML (eXtensible Markup Language) - XML is a markup language for defining, validating and sharing documents containing structured information. XML provides a file format for representing data, a schema for distinguishing and describing data structures and a mechanism for extending and notating HTML (the “language of the Internet”).

Unlike EDI, there is no central data repository for the Data Tag Definitions (DTD) or schema used in XML. As a relatively new, flexible and powerful programming language, there are many, many variations from one XML installation to another. Most XML implementations today are of a proprietary nature. Along with increased functionality comes increased complexity, which makes it more difficult to create a

one-size-fits-all version of XML. One of the great advantages of XML is that it goes beyond a standardized file structure and provides the ability to restrict activity based on business rules validation. In EDI, business rules are validated in the mapping process from the standard file format to the business application, which makes it possible to create EDI maps with relatively few variations.

Trading partners who exchange XML messages should educate themselves on the guidelines created by OASIS - the Organization for the Advancement of Structured Information Standards ([www.oasis-open.org](http://www.oasis-open.org)) and eBXML ([www.ebxml.org](http://www.ebxml.org)). These guidelines cover security and message framework. They work in concert with industry groups creating more specific XML implementation guidelines.

The XML implementer should be prepared to create a business messaging environment with maximum flexibility. The GSI organization ([www.gsl.org](http://www.gsl.org)) has created core XML message sets that provide a good place to start when creating XML messages for a particular business function.

While the ISA eBusiness Guideline endorses the use of XML, it is sensitive to the fact that Data Tag Definitions, schemas and message content has not reached the stage of maturity where it may be published as an industrial supply sector “standard.” The ISA will continue to work in concert with ISA trading partners as they pilot XML applications so industry conventions can be documented as they become stable.

### 4.3 Flat Files

**ISA Standardized Flat File Formats** – Flat file formats are currently being defined for a simple Purchase Order, exchanging Item Master data and Ship-to Location information. Not all trading partners are expected to send or receive flat file formats. The option is offered for those smaller trading partners that may not have EDI capability, given that flat file formats are acceptable to their trading partners.

When exchanging ISA Flat File Formats, it is critical that trading partners provide adequate security to ensure that business transactions are exchanged in a secure and select way.

### 4.4 Security, Encryption and Communication

**Security and Encryption** – The following must be taken into consideration when exchanging business data over a public network (i.e. the Internet):

- Encryption – allows the data to be seen, but not read or understood. Most encryption schemes today involve Public Key / Private Key encryption. Individual documents can be encrypted or an entire communication session can be encrypted from end to end.
- Non-Repudiation – provides assurance that the sender is who they say they are and they actually sent the information, and the receiver is the intended recipient and they actually received it.
- Authentication – is the concept that the data sent was the exact same data that was received and no one has made changes between the sender and receiver.

Careful consideration must be given when sending sensitive business data over the Internet, as an e-mail or e-mail attachment. They are usually not encrypted and could be intercepted and read by parties for whom they were not intended.

## 4.5 EBT Communications

There are various methods of exchanging electronic business transactions and third parties that will help a company determine the best method for its particular needs and trading partner configurations. Be reminded that data exchange methods that require data entry are not electronic business transactions. These include faxes and e-mail attachments.

- **Value Added Networks** provide the traditional method for exchanging EDI transaction sets. VANs communicate with each other, so it should not be necessary for a company to sign up with more than one VAN. In other words, two trading partners can each use a different VAN and still communicate with one another. A VAN provides many value-added services such as the ability to archive EDI data as part of a back up, disaster recovery plan; create drop-off and pick-up logs to provide an audit trail for activity; provide one communications portal and protocol, etc.
- **EDI/INT**, or EDI over the Internet, is another method for exchanging EDI and XML. Security is the most important component when any information is sent over the Internet. It is never advisable to send sensitive business data via peer-to-peer e-mail that is not encrypted. EDI/INT software packages have been tested for interoperability, so trading partners can select different software or service providers to send data over the Internet. For more information on this, please see [www.gs1us.org](http://www.gs1us.org). It is very important to select software or a service provider that has been tested for interoperability. Many Value Added Networks offer traditional VAN services as well as EDI/INT options.

There are three different types of EDI/INT:

- AS-1 uses Simple Mail Transfer Protocol and a dedicated mail server plus encryption software.
- AS-2, which is the most popular method of EDI/INT, uses secure Hyper Text Transfer Protocol.
- AS-3 uses Secure File Transfer Protocol.

**Direct Connect** – Two trading partners may elect to exchange data directly between them, using an agreed upon method.

# Chapter 5.0

## Data Alignment Process

Steps in the data alignment process include the following:

**Plan** - Initially, the buyer and seller in a relationship make contact and set up a business understanding before trade can proceed. Master Data is exchanged. Master Data includes basic business information such as contracts, routing guides, trading partner agreements, payment terms, product catalogues, price lists, locations, names, addresses, and item information. This data generally falls into two categories – item and party. Party data generally includes a Ship-to Location list with the Global Location Numbers, addresses and contact information for regular customer ship-to locations.

**Align Data** - Once good, clean master data is exchanged, a process must be established for maintaining this data both within a company and between trading partners. All other business processes depend on this step. The quality of master data alignment is the single biggest factor in the success of the Order, Deliver and Pay processes.

**Internal Data Integrity** - It is a best business practice to ensure that data is aligned internally by creating Master Data Files that hold Master Data and create an interface such that all other system applications pull data from the single Master Data File. For instance, in the case of trade item attributes, a Master Item File is created and all Enterprise Resource Planning (ERP) and Warehouse Management Systems (WMS) and Transportation Management Systems (TMS) draw item information from that one Item Master File. This is opposed to having to maintain item master information in several different files and systems.

All changes to a Master File should be transaction based. That is, no company associate should be allowed to access a file containing item master, purchase order, invoice, or shipping information and make changes directly. It is best business practice to create a change record, containing information about who made the change, date and time, reason, and the data to be changed. The application is programmed to systematically apply the changes, when they meet certain criteria, and to create an audit trail regarding the change.

It goes without saying that party and item master files must contain good, clean, accurate and up-to-date information. All items should be given a unique Global Trade Item Number, should be associated with a meaningful description and should be measured and weighed properly. Please see GS1 General Specifications© for more information on package measurement rules.

**Data Integrity between Trading Partners** – Once item and party data has been exchanged with your trading partner, a process must be established to maintain data integrity. One of two methods can be used. Trading partners may send and receive add and delete information, or may choose to send a completely new file to replace the old file. A combination of these methods may be used. Companies may agree to simply exchange adds and deletions as they occur, and then periodically exchange a complete refresh of an item master or location list. Data can be exchanged using EDI transaction sets or ISA-standardized flat files.

**Minimal Data Exchange in EDI** – When trading partners are confident that data is correctly represented in both their systems, it is preferable to exchange minimal information in electronic business transac-

tions. For instance, it is no longer necessary to send alternate part numbers, item description, unit of measure or weight in a purchase order or invoice once that data has been associated with a GTIN and aligned in both trading partners' systems. The trading partners simply need to exchange the GTIN.

**Item Master Data** – The ISA eBusiness Guideline has defined a minimal number of item attributes needed to adequately describe a trade item. Virtually all of the attributes are optional or conditional. Trading partners may agree to exchange other information, but care should be taken to ensure additional item attributes are really necessary for the trading relationship. Exchanging different attributes for different trading partners adds expense and complexity. If additional attributes are needed, trading partners should submit an ISA Change Request asking to have them added to the ISA Item Attribute List.

## 5.1 EDI Transaction Sets

The following EDI transactions are used in the data alignment process. ISA EDI Transaction Set Maps are published separately from this guideline. Please see the individual maps for more details on each EDI transaction set.

**EDI 832 Price Sales Catalog** - The ISA EDI 832 Price / Sales Catalog is sent from the supplier to the distributor, and communicates the item identification number, description, price and so on. Either a Global Trade Item Number (GTIN) or a Vendor Item Number must be used for the primary identification number of an item. The ISA eBusiness Guideline recommends the use of a GTIN (please see Chapter 2).

**EDI 816 Organizational Relationships** - The 816 Organization Relationships transaction set, as defined for use by the ISA eBusiness Guidelines, is the only EDI transaction set that may be sent by either the distributor or the supplier. It is used to convey company name and address information. It may be used to send contact information for individuals within a company, such as Accounts Receivable, Accounts Payable, EDI Coordinator, Shipping, Receiving, and so on.

The ISA 816 EDI map provides for the more simplified version of the 816 Organization Relationship structure. Corporate / Company information is sent in Table 1, at the Header Level. All information given in Table 2 at the Detail Level is associated with the Corporation / Company sending the document. Company information sent at the Detail Level is for Operating Units of the Corporation / Company. Examples of Operating Units are Distribution Centers, Branches, Stores, Consolidation Points and Drop Ship Locations.

Corporations, companies and operating units should be identified with a globally unique GS1 Global Location Number (please see Section 2.4). This eliminates the need for cross-reference, look-up files for each trading partner. All GLNs for all trading partner companies and operating units can be stored in one database, as they are guaranteed unique through the use of a GS1 Company Prefix.

Once GLN has been exchanged between trading partners, it is possible, for those with the capability within their business applications to look up address information based on the GLN, to just send the GLN in an EDI transaction. This eliminates the need to send complete name and address information in every EDI transaction set. For instance, in a purchase order, the distributor could just send the GLN of the Ship-to Branch and the supplier could look up the address and automatically populate the Ship-To in its Order Entry system.

## 5.2 XML Data Alignment Relevant Schemas

See the GS1 Business Message Standards for the following relevant XML schema ([www.gs1.org](http://www.gs1.org)):

Party

Price

Price Bracket

Trade Item Peer to Peer Data Alignment

### 5.3 ISA Item Attribute List

Data Element	Description	M/O/C	Type
GLN of Item Information Supplier	Global Location Number	O	N
** Part Number - GTIN	Global Trade Item Number	C	N
Duns Number of Item Information Supplier	same	O	N
** Part Number - Alternate	Manufacturer or Catalog number; i.e. not the GTIN	C	AN
** Part Number - Custom Base Article Number (CBAN)	Base Article Number used to indicate this item is available in a custom configuration	C	N
Made-to-Order Variation Number	In conjunction with a GTIN, used to identify a particular version of a custom item	Not in Item Master File	N
Description 1	Description of the item	M	AN
Description 2	If needed, additional description for item	O	AN
Weight	Weight of item, including the immediate package, to 2 decimal places	O	N
Unit of weight	Unit of weight	O	AN
Cube	L x W x H of item in immediate package	O	N
Unit of Cube Measurement	Unit of measurement		AN
HazMat Information	Hazardous Material information	C (if applicable)	AN
Quantity in Inner Pack	Eaches in an inner pack	C (if an inner pack)	N
Quantity of Eaches in a Carton	Eaches in a standard carton	C (if a carton)	N
Quantity of Inner Packs in a Carton	Number of Inner Packs in a Carton	C (if a carton)	N
Production Lead Time	Calendar Days between order and delivery	O	N
Retail Price	Retail price per Unit of Measure	O	N
Harmonization Code	Harmonization Code	O	AN
Unit of Measure	Unit of Measure	O	AN
Item Country of Origin	ISO Code for Country of Origin	O	AN
Item Engineering Change Level	Engineering Change Level	O	AN
Item Obsolete Date	Date Item becomes Obsolete	O	D
Item Obsolete Replacement ID	If applicable, Obsolete Item Replace ID	O	AN
Item Price Effective Start Date	Date Item Retail Price goes into effect	O	D
Drawing Number	Drawing Number	O	AN

M = Mandatory, O = Optional, C = Conditional, AN = AlphaNumeric; N = Numeric, D = Date

\*\* Each item needs at least one of: Global Trade Item Number (GTIN), Alternate Part Number, or Custom Base Article Number.

# Chapter 6.0

## Order Process

The following describes the order process between the industrial supply distributor and the supplier / manufacturer.

**Data Alignment** - Once item and party information is aligned, trading partners can exchange minimal data when ordering products. Because both trading partners have the same description, unit of measure, item weight, etc., they only need to exchange the GTIN of the item when ordering or acknowledging an order. Likewise, when address information has been exchanged regarding bill-to and ship-to locations, it is not necessary to send that information in every purchase order document. However, through trading partner agreement, two parties may decide to include full shipping information in each PO if a trading partner is not capable of retrieving that information based on a Global Location Number or other type of location identifier.

**Purchase Order Types** - The ISA eBusiness Implementation Guideline suggests that there be only one ship-to and one ship method per purchase order. Types of purchase orders include:

- Simple PO - One ship or delivery date per PO
- Multiple Ship Dates - Ship or delivery dates are expressed at the item level (this type of PO may be more difficult for some trading partners to automatically process)
- Blanket Purchase Order - Orders for which purchase order releases will be issued in the future
- Release Purchase Order - Releases against a Blanket Purchase Order

**PO Acknowledgements** - The method used to acknowledge or confirm a purchase order is subject to trading partner agreement. If a distributor sends an EDI purchase order to a supplier and receives an EDI Functional Acknowledgement, that may be considered sufficient. Other distributors may request or require a formal PO Acknowledgement, via EDI or fax.

Whether formally acknowledged or not, it is a best business practice for the supplier to interrogate every purchase order upon receipt, to determine if it includes sufficient and correct information, and to determine if shipping quantities and dates can be met.

### 6.1 EDI Transaction Sets

**EDI 850 Purchase Order** - The ISA EDI 850 PO is sent from the distributor to the supplier. When mapping an EDI purchase order into the business application, please keep in mind that a line item on a PO may have a price of zero (samples, displays, services, etc.).

**EDI 855 Purchase Order Acknowledgement** - The ISA EDI 855 PO Acknowledgement is sent from the supplier to the distributor to accept, accept with changes or reject a PO. When acknowledging a PO Release with an 855 PO Acknowledgement, place the PO Release Number in the 855 PO Acknowledgement BAK05 Release Number.

If the buyer does not accept the conditions of the 855 PO Acknowledgement, they must either cancel the PO or contact the supplier for resolution.

## 6.2 XML Purchase Order Relevant Schemas

See the GS1 Business Message Standards for the following relevant XML schema ([www.gs1.org](http://www.gs1.org)):

Order

Order Response

# Chapter 7.0

## Pay Process

The payment process follows the shipment of the order. When an invoice is sent immediately after the goods are shipped, the distributor may use the information to plan the receipt of goods and reconcile the items received with the items invoiced. At this time, the ISA eBusiness Guidelines do not include an EDI ship notice. Some of the data elements normally provided in the EDI 856 Ship Notice / Manifest are included in the ISA EDI 810 Invoice, including the Bill of Lading number and the package carrier tracking ID. Accurate bar code labeling of the items shipped and a timely invoice will aid the distributor in receiving.

Payment may be made through Electronic Funds Transfer, based on trading partner agreements.

### 7.1 EDI Transactions

**EDI 810 Invoice** - The ISA EDI 810 Invoice is sent from the supplier to the distributor. When mapping an EDI invoice into the business application, please keep in mind that a line item on an invoice may have a price of zero (samples, displays, services, etc.).

### 7.2 Pay Process Relevant XML Schema

See the GS1 Business Message Standards for the following relevant XML schema ([www.gs1.org](http://www.gs1.org)):

- Control Total - Buyer to Buyer
- Debit or Credit Advice
- Request for Payment
- Settlement
- Financial Institution Control Totals
- Buyer Reconciliation of Request for Payment

## Appendix A - Glossary

**AIDC – Automatic Identification Data Capture** - AIDC includes various methods for capturing information such as a GTIN, SSCC and a GLN. AIDC includes linear, high-density and composite bar codes, Radio Frequency Identification (RFID) and Electronic Product Codes (EPC).

**Brand Owner** - The Brand Owner is the organization that owns the specifications of the trade item regardless of where and by whom it is manufactured, and is responsible for the allocation of the Global Trade Item Number (GTIN).

**Customer** - A buyer in the supply chain downstream from the manufacturer. Customers are wholesalers, distributors or dealers, and their customers are end-users. The manufacturer is the customer when buying raw materials.

**Distributor/Dealer** - The company that sells and distributes products to end-users.

**EDI - Electronic Data Interchange**. The computer-to-computer transmission of business information using a public standard format.

**EFT - Electronic Funds Transfer**. The electronic transfer of funds from one trading partner's account to another trading partner's account.

**EAN-8; EAN-13** - EAN-8 and EAN-13 are types of GTINs. They are approved for use at point-of-sale devices outside North America, and, after January 1, 2005, in North America. They are constructed using a company prefix assigned by GS1 and are carried in the EAN bar code symbology.

**EAN/UCC-14** - An EAN/UCC-14 is a type of GTIN. It can be carried in several bar code symbologies, including UCC/EAN-128 symbology and ITF-14. It must begin with 1-9. It denotes multiples (case or pallet) of the same UCC-12. An EAN/UCC-14 is not currently approved for trade items sold at point of sale.

**End-User** - Company or individual who is the last buyer in the supply chain and the user of the product. The consumer of the product.

**GLN – Global Location Number** - Global Location Numbers are used to uniquely identify physical locations and legal entities (such as a company or a division of a company, a warehouse or dock door). They are built using a GS1 company prefix.

**GRAI – Global Returnable Asset Identifier** - The GRAI is a unique asset number for returnable equipment, such as pallets and overseas containers. The GS1 identification number of a returnable asset (GRAI) is defined as a physical item with no reference to the contents.

**GS1** - GS1 is the combined EAN-International and Uniform Code Council. It manages the GS1 system of keys and electronic business transactions (XML and EDI). [www.gs1.org](http://www.gs1.org)

**GS1 Company Prefix** - A GS1 Company Prefix is used to build globally unique numbers for trade items, locations, logistics containers, etc. It is a company prefix assigned by a GS1 Member Organization. When the prefix has been assigned by GS1-US, a leading zero is used with the number to create a GS1 prefix. The only exception to this is the UCC-12 used in U.P.C. symbology.

**GTIN - Global Trade Item Number** - A GTIN is used to identify Global Trade Items (products and services) sold, delivered, warehoused, and billed throughout the supply chain. GTINs include the UCC-12, EAN-8, EAN-13 and EAN/UCC-14. A GTIN is a part number.

**Information System(s)** - The capture, storage and use of business information. This may be manual record keeping or the use of computerized information management systems and programs.

**Logistics Units** - Logistics units are units that store or transport any combination of trade items and which need to be identified and managed through the supply chain. Examples include cartons and pallets.

**Made-To-Order** - The manufacturing of a special product to a customer's requirements. A special product could be a new product built to order or a product that is configured to order from a list of available configuration options.

**Manufacturer** - The company that manufactures and supplies products to its customers, which are distributors, dealers, wholesalers or the end-user.

**Serial Shipping Container Code - SSCC** - The SSCC is a unique license plate number for each logistics unit. Two cartons may contain the same GTIN but will have different SSCCs. SSCCs tie the logistics unit to complete shipment data in an electronically exchanged Ship Notice/Dispatch Advice.

**Trade Item** - A trade item is any item (product or service) upon which there is a need to retrieve pre-defined information and that may be priced, or ordered, or invoiced at any point in any supply chain.

**UCC-12** - The UCC-12 is one type of GTIN. When carried in U.P.C. bar code symbology, it may be used at a point-of-sale device. A UCC-12 may also be carried in other bar code symbology when constructed according to specific rules.

**U.P.C. - Universal Product Code**. The symbology used to carry a UCC-12, which is a type of Global Trade Item Number (GTIN), comprised of 12 digits in a UCC-12 structure, which is the U.P.C. Company Prefix, reference number and check digit.

**XML – eXtensible Markup Language** - XML is a markup language for defining, validating and sharing documents containing structured information.

# Appendix B – ISA eBusiness Guideline Change Request Form

## Company Information:

Company Name: \_\_\_\_\_

Contact: \_\_\_\_\_

Phone: \_\_\_\_\_

E-mail: \_\_\_\_\_

A current ISA member?  Yes  No

## Change Request Information

1. Please provide a description of the proposed ISA eBusiness Guideline change:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. Please provide a business case scenario demonstrating the need for the change:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3. What Trading Partners have agreed to implement this change?:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4. If known, what are the technical changes needed (EDI segments, elements, etc.):

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Documents may be attached to help explain the CR. Send this form and documentation to:

**Industrial Supply Association • 100 N. 20th St., 4th Floor • Philadelphia, PA 19103 •  
Fax: (215) 564-2175 • Toll-free fax: (877) 460-2365**

# Appendix C - Mod 10 Check Digit Calculation

When calculating a Mod 10 check digit, always start from the right. Padding a number with zeros on the left will not affect the check digit calculation results. Most bar code printing software includes a tool to calculate the check digit.

Add the even number digits, then add the odd number digits. Multiply the sum of the odd digits by three, and add this to the sum of the even digits. Take the remainder, when dividing the total by 10 and subtract the remainder from 10. This is the check digit. If the remainder is 10, the check digit is zero.

Example: 00006508732924269

1. Adding the even digits = 35
2. Adding the odd digits = 28
3. Multiply the sum of the odd digits by 3:  $28 * 3 = 84$
4. Add that total to the sum of the even digits:  $84 + 35 = 119$
5. The remainder when divided by 10:  $119 / 10 = 11 \text{ R } 9$
6. Subtract the remainder from 10:  $10 - 9 = 1$
7. The check digit is ONE

If the answer in step six is 10, the check digit is zero

	Digit Position																	Check digit
EAN-8											N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	N <sub>4</sub>	N <sub>5</sub>	N <sub>6</sub>	N <sub>7</sub>	N <sub>8</sub>
UCC-12							N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	N <sub>4</sub>	N <sub>5</sub>	N <sub>6</sub>	N <sub>7</sub>	N <sub>8</sub>	N <sub>9</sub>	N <sub>10</sub>	N <sub>11</sub>	N <sub>12</sub>
EAN-13						N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	N <sub>4</sub>	N <sub>5</sub>	N <sub>6</sub>	N <sub>7</sub>	N <sub>8</sub>	N <sub>9</sub>	N <sub>10</sub>	N <sub>11</sub>	N <sub>12</sub>	N <sub>13</sub>
EAN/UCC-14					N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	N <sub>4</sub>	N <sub>5</sub>	N <sub>6</sub>	N <sub>7</sub>	N <sub>8</sub>	N <sub>9</sub>	N <sub>10</sub>	N <sub>11</sub>	N <sub>12</sub>	N <sub>13</sub>	N <sub>14</sub>
17 digits		N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	N <sub>4</sub>	N <sub>5</sub>	N <sub>6</sub>	N <sub>7</sub>	N <sub>8</sub>	N <sub>9</sub>	N <sub>10</sub>	N <sub>11</sub>	N <sub>12</sub>	N <sub>13</sub>	N <sub>14</sub>	N <sub>15</sub>	N <sub>16</sub>	N <sub>17</sub>
18 digits	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	N <sub>4</sub>	N <sub>5</sub>	N <sub>6</sub>	N <sub>7</sub>	N <sub>8</sub>	N <sub>9</sub>	N <sub>10</sub>	N <sub>11</sub>	N <sub>12</sub>	N <sub>13</sub>	N <sub>14</sub>	N <sub>15</sub>	N <sub>16</sub>	N <sub>17</sub>	N <sub>18</sub>
Multiply value of each position by																		
	x3	x1	x3	x1	x3	x1	x3	x1	x3	x1	x3	x1	x3	x1	x3	x1	x3	
	Accumulated results = Sum																	
	Subtract Sum from nearest equal or higher multiple of 10 = Check Digit																	

# Appendix D - Application Identifiers

From the GS1 General Specifications®

AI	Full Title	Format	Data Title
00	SSCC (Serial Shipping Container Code)	n2+n18	SSCC
01	Global Trade Item Number™	n2+n14	GTIN™
02	GTIN of Trade Items Contained in a logistic unit	n2+n14	CONTENT
10	Batch or lot number	n2+an..20	BATCH/LOT
11	Production date (YYMMDD)	n2+n6	PROD DATE
12	Due date (YYMMDD)	n2+n6	DUE DATE
13	Packaging date (YYMMDD)	n2+n6	PACK DATE
15	Best before date (YYMMDD)	n2+n6	BEST BEFORE or SELL BY
17*	Expiration date (YYMMDD)	n2+n6	USE BY OR EXPIRY
20	Product variant	n2+n2	VARIANT
21	Serial number	n2+an..20	SERIAL
22	Secondary data for specific health care products	n2+an..29	QTY/DATE/BATCH
240	Additional product identification assigned by the manufacturer	n3+an..30	ADDITIONAL ID
241	Customer part number	n3+an..30	CUST. PART NO.
242	Made-to-Order Variation Number	n3+n...6	MADE-TO-ORDER
250	Secondary serial number	n3+an..30	SECONDARY SERIAL
251	Reference to source entity	n3+an..30	REF. TO SOURCE
253	Global Document Type Identifier	n3+n13+n..17	DOC. ID
30	Variable count	n2+n..8	VAR. COUNT
310n-369n	(Trade and logistic measurements)	n4+n6	
337n	Kilograms per square metre	n4+n6	KG PER m_
37	Count of trade items contained in a logistic unit	n2+n..8	COUNT
390(n)	Amount payable – single monetary area	n4+n..15	AMOUNT
391(n)	Amount payable – with ISO currency code	n4+n3+n..15	AMOUNT
392(n)	Amount payable for a Variable Measure Trade Item – single monetary unit	n4+n..15	PRICE
393(n)	Amount payable for a Variable Measure Trade Item – with ISO currency code	n4+n3+n..15	PRICE
400	Customer's purchase order number	n3+an..30	ORDER NUMBER
401	Consignment number	n3+an..30	CONSIGNMENT
402	Shipment Identification Number	n3+n17	SHIPMENT NO.
403	Routing code	n3+an..30	ROUTE
410	Ship to - deliver to GLN	n3+n13	SHIP TO LOC
411	Bill to - invoice to GLN	n3+n13	BILL TO
412	Purchased from GLN	n3+n13	PURCHASE FROM
413	Ship for - deliver for - forward to GLN	n3+n13	SHIP FOR LOC
414	Identification of a physical location GLN	n3+n13	LOC No
415	GLN of the Invoicing Party	n3+n13	PAY TO
420	Ship to - deliver to postal code within a single	n3+an..20	SHIP TO POST

	postal authority		
421	Ship to - deliver to postal code with Three-Digit ISO country code	n3+n3+an..9	SHIP TO POST
422	Country of origin of a trade item	n3+n3	ORIGIN
423	Country of initial processing	n3+n3+n..12	COUNTRY - INITIAL PROCESS
424	Country of processing	n3+n3	COUNTRY - PROCESS.
425	Country of disassembly	n3+n3	COUNTRY - DISASSEMBLY
426	Country covering full process chain	n3+n3	COUNTRY FULL PROCESS
7001	NATO stock number	n4+n13	NSN
7002	UN/ECE meat carcasses and cuts classification	n4+an..30	MEAT CUT
703(s)	Approval number of processor with ISO country code	n4+n3+an..27	PROCESSOR # s4
8001	Roll products - width, length, core diameter, direction, and splices	n4+n14	DIMENSIONS
8002	Electronic serial identifier for cellular telephones	n4+an..20	CMT No
8003	GS1 Global Returnable Asset Identifier	n4+n14+an..16	GRAI
8004	GS1 Global Individual Asset Identifier	n4+an..30	GIAI
8005	Price per unit of measure	n4+n6	PRICE PER UNIT
8006	Identification of the component of a trade item	n4+n14+n2+n2	GCTIN
8007	International Bank Account Number	n4+an..30	IBAN
8008	Date and time of production	n4+n8+n..4	PROD TIME
8018	GS1 Global Service Relation Number	n4+n18	GSRN
8020	Payment Slip Reference Number	n4+an..25	REF No
8100	GS1-128 Coupon Extended Code - NSC + Offer Code	n4+n1+n5	-
8101	GS1-128 Coupon Extended Code - NSC + Offer Code + end of offer code	n4+n1+n5+n4	-
8102	GS1-128 Coupon Extended Code - NSC	n4+n1+n1	-
90	Information mutually agreed between trading partners (including FACT DIs)	n2+an..30	INTERNAL
91-99	Company internal information	n2+an..30	INTERNAL

## Appendix E - ISO Country Code List

Country	A 2	A 3	Number
AFGHANISTAN	AF	AF	004
ALBANIA	AL	ALB	008
ALGERIA	DZ	DZA	012
AMERICAN SAMOA	AS	ASM	016
ANDORRA	AD	AND	020
ANGOLA	AO	AGO	024
ANGUILLA	AI	AIA	660
ANTARCTICA	AQ	ATA	010
ANTIGUA AND BARBUDA	AG	ATG	028
ARGENTINA	AR	ARG	032
ARMENIA	AM	ARM	051
ARUBA	AW	ABW	533
AUSTRALIA	AU	AUS	036
AUSTRIA	AT	AUT	040
AZERBAIJAN	AZ	AZE	031
BAHAMAS	BS	BHS	044
BAHRAIN	BH	BHR	048
BANGLADESH	BD	BGD	050
BARBADOS	BB	BRB	052
BELARUS	BY	BLR	112
BELGIUM	BE	BEL	056
BELIZE	BZ	BLZ	084
BENIN	BJ	BEN	204
BERMUDA	BM	BMU	060
BHUTAN	BT	BTN	064
BOLIVIA	BO	BOL	068
BOSNIA AND HERZEGOWINA	BA	BIH	070
BOTSWANA	BW	BWA	072
BOUVET ISLAND	BV	BVT	074
BRAZIL	BR	BRA	076
BRITISH INDIAN OCEAN TERRITORY	IO	IOT	086
BRUNEI DARUSSALAM	BN	BRN	096
BULGARIA	BG	BGR	100
BURKINA FASO	BF	BFA	854
BURUNDI	BI	BDI	108
CAMBODIA	KH	KHM	116
CAMEROON	CM	CMR	120
CANADA	CA	CAN	124
CAPE VERDE	CV	CPV	132
CAYMAN ISLANDS	KY	CYM	136
CENTRAL AFRICAN REPUBLIC	CF	CAF	140
CHAD	TD	TCD	148
CHILE	CL	CHL	152

CHINA	CN	CHN	156
CHRISTMAS ISLAND	CX	CXR	162
COCOS (KEELING) ISLANDS	CC	CCK	166
COLOMBIA	CO	COL	170
COMOROS	KM	COM	174
CONGO, Democratic Republic of (was Zaire)	CD	COD	180
CONGO, People's Republic of	CG	COG	178
COOK ISLANDS	CK	COK	184
COSTA RICA	CR	CRI	188
COTE D'IVOIRE	CI	CIV	384
CROATIA (local name: Hrvatska)	HR	HRV	191
CUBA	CU	CUB	192
CYPRUS	CY	CYP	196
CZECH REPUBLIC	CZ	CZE	203
DENMARK	DK	DNK	208
DJIBOUTI	DJ	DJI	262
DOMINICA	DM	DMA	212
DOMINICAN REPUBLIC	DO	DOM	214
EAST TIMOR	TL	TLS	626
ECUADOR	EC	ECU	218
EGYPT	EG	EGY	818
EL SALVADOR	SV	SLV	222
EQUATORIAL GUINEA	GQ	GNQ	226
ERITREA	ER	ERI	232
ESTONIA	EE	EST	233
ETHIOPIA	ET	ETH	231
FALKLAND ISLANDS (MALVINAS)	FK	FLK	238
FAROE ISLANDS	FO	FRO	234
FIJI	FJ	FJI	242
FINLAND	FI	FIN	246
FRANCE	FR	FRA	250
FRANCE, METROPOLITAN	FX	FXX	249
FRENCH GUIANA	GF	GUF	254
FRENCH POLYNESIA	PF	PYF	258
FRENCH SOUTHERN TERRITORIES	TF	ATF	260
GABON	GA	GAB	266
GAMBIA	GM	GMB	270
GEORGIA	GE	GEO	268
GERMANY	DE	DEU	276
GHANA	GH	GHA	288
GIBRALTAR	GI	GIB	292
GREECE	GR	GRC	300
GREENLAND	GL	GRL	304
GRENADA	GD	GRD	308
GUADELOUPE	GP	GLP	312
GUAM	GU	GUM	316
GUATEMALA	GT	GTM	320
GUINEA	GN	GIN	324
GUINEA-BISSAU	GW	GNB	624
GUYANA	GY	GUY	328

HAITI	HT	HTI	332
HEARD AND MC DONALD ISLANDS	HM	HMD	334
HONDURAS	HN	HND	340
HONG KONG	HK	HKG	344
HUNGARY	HU	HUN	348
ICELAND	IS	ISL	352
INDIA	IN	IND	356
INDONESIA	ID	IDN	360
IRAN (ISLAMIC REPUBLIC OF)	IR	IRN	364
IRAQ	IQ	IRQ	368
IRELAND	IE	IRL	372
ISRAEL	IL	ISR	376
ITALY	IT	ITA	380
JAMAICA	JM	JAM	388
JAPAN	JP	JPN	392
JORDAN	JO	JOR	400
KAZAKHSTAN	KZ	KAZ	398
KENYA	KE	KEN	404
KIRIBATI	KI	KIR	296
KOREA, DEMOCRATIC PEOPLE'S REPUBLIC OF	KP	PRK	408
KOREA, REPUBLIC OF	KR	KOR	410
KUWAIT	KW	KWT	414
KYRGYZSTAN	KG	KGZ	417
LAO PEOPLE'S DEMOCRATIC REPUBLIC	LA	LAO	418
LATVIA	LV	LVA	428
LEBANON	LB	LBN	422
LESOTHO	LS	LSO	426
LIBERIA	LR	LBR	430
LIBYAN ARAB JAMAHIRIYA	LY	LBY	434
LIECHTENSTEIN	LI	LIE	438
LITHUANIA	LT	LTU	440
LUXEMBOURG	LU	LUX	442
MACAU	MO	MAC	446
MACEDONIA, FORMER YUGOSLAV REPUBLIC OF	MK	MKD	807
MADAGASCAR	MG	MDG	450
MALAWI	MW	MWI	454
MALAYSIA	MY	MYS	458
MALDIVES	MV	MDV	462
MALI	ML	MLI	466
MALTA	MT	MLT	470
MARSHALL ISLANDS	MH	MHL	584
MARTINIQUE	MQ	MTQ	474
MAURITANIA	MR	MRT	478
MAURITIUS	MU	MUS	480
MAYOTTE	YT	MYT	175
MEXICO	MX	MEX	484
MICRONESIA, FEDERATED STATES OF	FM	FSM	583
MOLDOVA, REPUBLIC OF	MD	MDA	498
MONACO	MC	MCO	492
MONGOLIA	MN	MNG	496

MONTSERRAT	MS	MSR	500
MOROCCO	MA	MAR	504
MOZAMBIQUE	MZ	MOZ	508
MYANMAR	MM	MMR	104
NAMIBIA	NA	NAM	516
NAURU	NR	NRU	520
NEPAL	NP	NPL	524
NETHERLANDS	NL	NLD	528
NETHERLANDS ANTILLES	AN	ANT	530
NEW CALEDONIA	NC	NCL	540
NEW ZEALAND	NZ	NZL	554
NICARAGUA	NI	NIC	558
NIGER	NE	NER	562
NIGERIA	NG	NGA	566
NIUE	NU	NIU	570
NORFOLK ISLAND	NF	NFK	574
NORTHERN MARIANA ISLANDS	MP	MNP	580
NORWAY	NO	NOR	578
OMAN	OM	OMN	512
PAKISTAN	PK	PAK	586
PALAU	PW	PLW	585
PALESTINIAN TERRITORY, Occupied	PS	PSE	275
PANAMA	PA	PAN	591
PAPUA NEW GUINEA	PG	PNG	598
PARAGUAY	PY	PRY	600
PERU	PE	PER	604
PHILIPPINES	PH	PHL	608
PITCAIRN	PN	PCN	612
POLAND	PL	POL	616
PORTUGAL	PT	PRT	620
PUERTO RICO	PR	PRI	630
QATAR	QA	QAT	634
REUNION	RE	REU	638
ROMANIA	RO	ROU	642
RUSSIAN FEDERATION	RU	RUS	643
RWANDA	RW	RWA	646
SAINT KITTS AND NEVIS	KN	KNA	659
SAINT LUCIA	LC	LCA	662
SAINT VINCENT AND THE GRENADINES	VC	VCT	670
SAMOA	WS	WSM	882
SAN MARINO	SM	SMR	674
SAO TOME AND PRINCIPE	ST	STP	678
SAUDI ARABIA	SA	SAU	682
SENEGAL	SN	SEN	686
SEYCHELLES	SC	SYC	690
SIERRA LEONE	SL	SLE	694
SINGAPORE	SG	SGP	702
SLOVAKIA (Slovak Republic)	SK	SVK	703
SLOVENIA	SI	SVN	705
SOLOMON ISLANDS	SB	SLB	090

SOMALIA	SO	SOM	706
SOUTH AFRICA	ZA	ZAF	710
SOUTH GEORGIA / SOUTH SANDWICH ISLANDS	GS	SGS	239
SPAIN	ES	ESP	724
SRI LANKA	LK	LKA	144
ST. HELENA	SH	SHN	654
ST. PIERRE AND MIQUELON	PM	SPM	666
SUDAN	SD	SDN	736
SURINAME	SR	SUR	740
SVALBARD AND JAN MAYEN ISLANDS	SJ	SJM	744
SWAZILAND	SZ	SWZ	748
SWEDEN	SE	SWE	752
SWITZERLAND	CH	CHE	756
SYRIAN ARAB REPUBLIC	SY	SYR	760
TAIWAN	TW	TWN	158
TAJIKISTAN	TJ	TJK	762
TANZANIA, UNITED REPUBLIC OF	TZ	TZA	834
THAILAND	TH	THA	764
TOGO	TG	TGO	768
TOKELAU	TK	TKL	772
TONGA	TO	TON	776
TRINIDAD AND TOBAGO	TT	TTO	780
TUNISIA	TN	TUN	788
TURKEY	TR	TUR	792
TURKMENISTAN	TM	TKM	795
TURKS AND CAICOS ISLANDS	TC	TCA	796
TUVALU	TV	TUV	798
UGANDA	UG	UGA	800
UKRAINE	UA	UKR	804
UNITED ARAB EMIRATES	AE	ARE	784
UNITED KINGDOM	GB	GBR	826
UNITED STATES	US	USA	840
UNITED STATES MINOR OUTLYING ISLANDS	UM	UMI	581
URUGUAY	UY	URY	858
UZBEKISTAN	UZ	UZB	860
VANUATU	VU	VUT	548
VATICAN CITY STATE (HOLY SEE)	VA	VAT	336
VENEZUELA	VE	VEN	862
VIETNAM	VN	VNM	704
VIRGIN ISLANDS (BRITISH)	VG	VGB	092
VIRGIN ISLANDS (U.S.)	VI	VIR	850
WALLIS AND FUTUNA ISLANDS	WF	WLF	876
WESTERN SAHARA	EH	ESH	732
YEMEN	YE	YEM	887
YUGOSLAVIA	YU	YUG	891
ZAMBIA	ZM	ZMB	894